FORM PTO-1390 (Modified) (REV 11-2000) U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

ATTORNEY'S DOCKET NUMBER	U.S APPLICATION NO (IF KNOWN, SEE 37 CFR
04783/022001	10/049384

INTERNATIONAL APPLICATION NO	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/JP00/05414	11 August 2000	11 August 1999

TITLE OF INVENTION
KEYWORD INFERRING DEVICE AND KEYWORD INFERRING METHOD

APPLICANT(S) FOR DO/EO/US
Masanobu HIRA

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S C 371.
3. ☒ This is an express request to begin national examination procedures (35 U.S.C. 371(f)). The submission must include items (5), (6), (9) and (24) indicated below.
4. ☐ The US has been elected by the expiration of 19 months from the priority date (Article 31).
5. ☒ A copy of the International Application as filed (35 U.S.C. 371 (c) (2))
   a. ☐ is attached hereto (required only if not communicated by the International Bureau).
   b. ☒ has been communicated by the International Bureau
   c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☒ An English language translation of the International Application as filed (35 U.S.C. 371(c)(2)).
   a. ☒ is attached hereto.
   b. ☐ has been previously submitted under 35 U.S.C. 154(d)(4).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371 (c)(3))
   a. ☒ are attached hereto (required only if not communicated by the International Bureau)
   b. ☐ have been communicated by the International Bureau.
   c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
   d. ☐ have not been made and will not be made
8. ☒ An English language translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371 (c)(4)).
10. ☐ An English language translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U S.C. 371 (c)(5)).
11. ☐ A copy of the International Preliminary Examination Report (PCT/IPEA/409).
12. ☒ A copy of the International Search Report (PCT/ISA/210).

Items 13 to 20 below concern document(s) or information included:

13. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
14. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
15. ☐ A **FIRST** preliminary amendment.
16. ☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
17. ☐ A substitute specification.
18. ☐ A change of power of attorney and/or address letter.
19. ☐ A computer-readable form of the sequence listing in accordance with PCT Rule 13ter.2 and 35 U.S.C. 1.821 - 1.825.
20. ☐ A second copy of the published international application under 35 U.S.C 154(d)(4).
21. ☐ A second copy of the English language translation of the international application under 35 U.S C. 154(d)(4).
22. ☒ Certificate of Mailing by Express Mail
23. ☒ Other items or information:

Article 34 Amendment (7 pages)

U.S. APPLICATION NO (IF KNOWN, SEE 37 CFR)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NUMBER
10/049384	PCT/JP00/05414	04783/022001

24. The following fees are submitted..	CALCULATIONS PTO USE ONLY
BASIC NATIONAL FEE (37 CFR 1.492 (a) (1) - (5)) :	
☐ Neither international preliminary examination fee (37 CFR 1.482) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO **$1040.00**	
☒ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO **$890.00**	
☐ International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO **$740.00**	
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO but all claims did not satisfy provisions of PCT Article 33(1)-(4) **$710.00**	
☐ International preliminary examination fee (37 CFR 1.482) paid to USPTO and all claims satisfied provisions of PCT Article 33(1)-(4) **$100.00**	
ENTER APPROPRIATE BASIC FEE AMOUNT =	**$890.00**
Surcharge of **$130.00** for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (e)).	**$0.00**

CLAIMS	NUMBER FILED	NUMBER EXTRA	RATE		
Total claims	11 - 20 =	0	x $18.00	**$0.00**	
Independent claims	5 - 3 =	2	x $84.00	**$168.00**	
Multiple Dependent Claims **(check if applicable)**.			☐	**$0.00**	
TOTAL OF ABOVE CALCULATIONS =				**$1,058.00**	
☐ Applicant claims small entity status. See 37 CFR 1 27). The fees indicated above are reduced by 1/2.				**$0.00**	?
SUBTOTAL =				**$1,058.00**	
Processing fee of **$130.00** for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492 (f)). +				**$0.00**	
TOTAL NATIONAL FEE =				**$1,058.00**	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31) **(check if applicable).** ☐				**$0.00**	
TOTAL FEES ENCLOSED =				**$1,058.00**	
				Amount to be: refunded	$
				charged	$

a. ☒ A check in the amount of **$1,058.00** to cover the above fees is enclosed.

b. ☐ Please charge my Deposit Account No. _____ in the amount of _____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. **50-0591** A duplicate copy of this sheet is enclosed.

d. ☐ Fees are to be charged to a credit card. **WARNING:** Information on this form may become public. **Credit card information should not be included on this form.** Provide credit card information and authorization on PTO-2038.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

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DATE

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): **Masanobu HIRA**			Docket No. **04783/022001**
Serial No. 10/049384	Filing Date	Examiner	Group Art Unit

Invention: **KEYWORD INFERRING DEVICE AND KEYWORD INFERRING METHOD**

I hereby certify that this **PCT National Phase Application and attachments**
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PATENT
ATTORNEY DOCKET NO · 04783/022001

APPLICATION

FOR

UNITED STATES LETTERS PATENT

TITLE: **KEYWORD INFERRING DEVICE AND KEYWORD INFERRING METHOD**

APPLICANT: **Masanobu HIRA**

"EXPRESS MAIL" Label No.: EV049244459US

Date of Deposit: 11 February 11, 2002

13/prts

DESCRIPTION

KEYWORD INFERRING DEVICE AND KEYWORD INFERRING METHOD

TECHNICAL FIELD

This invention relates to keyword inferring technology, and typically, to keyword inferring technology used by a recommendation engine offered on the World Wide Web.

BACKGROUND ART

The rapid expansion of the World Wide Web in recent years has been accompanied by a variety of services offered on the Web.

For example, Web sites which provide search services accept search conditions from a user, search a database according to the search conditions, and provide the search results to the user. That is, the user inputs the search conditions (keywords, genre, attributes, and similar) in a search condition input form which is transferred from the search site. Then, when the user transmits this form, the search engine searches the database according to the above conditions, and presents a list of headers of the information resource as the search result. Links to detailed information exist in these headers. The user selects those headers among the above displayed list of headers which appear to be of interest, and follows the links to refer to detailed information.

Web sites which provide recommendation services accumulate an action log for a user, use this accumulated

action log as a clue to infer information which is likely to be of interest to the user, and recommend information resources to the user.

Web sites which provide such services employ a variety of innovations to enhance the convenience to the user. For example, tasks are performed in which genres are defined and classified in advance, and information resources are classified according to these genres; or, expressions which suggest features of information resources are extracted either automatically or manually, and appended as key phrases.

However, the tasks of classifying information resources into genres, and extracting characteristic expressions for these information resources and appending them as key phrases, are performed subjectively on the website management side, and so depending on the content [of these resources], it may not be possible for users to search for the information they truly desire, or search results may contain unnecessary information, so that in some cases user demands are not satisfied. In particular, when key phrases extracted automatically from text contained in an information resource is appended, there is a tendency for information not necessary for the user to be included; whereas if an attempt is made to improve the precision of genre classifications and key phrases, tasks become complex, and the burden imposed on the website manager becomes onerous.

An object of the present invention is to provide a keyword inferring device, which infers an appropriate keyword

to use as a clue in a search from keywords obtained by user operation, so that searches for information resources truly desired by the user can be performed.

DISCLOSURE OF THE INVENTION

The gist of the present invention involves extraction of a keyword group to serve as clues in searching for information resources by broad genres; construction of a dictionary which joins relations between abstract and concrete terms for each genre; and the inference and presentation of information resources in which the user is likely to have an interest, using keywords contained in an action log which is updated upon access of a website by the user and in information resources accessed by the user, referring to the dictionary.

In general, the action of a user at such a website may be described as "forming a vague image of the object desired by the user, inputting to a search condition input form information representing the features of the object, referring to information in a presented list, and selecting items close to the object." In other words, the information selected by the user from among the presented list of information is close to a concrete form of the object desired by the user, as imagined within the user's mind. In terms of a keyword relationship, this may be expressed by saying that the relation between keywords contained in information represented by the object desired by the user, as originally imagined by the user, and keywords contained in the selected information, is that of an abstract-concrete relation.

Hence the keyword inferring device of this invention is characterized in that, based on a first keyword obtained by user operation, an abstract keyword semantically containing the first keyword is identified, and one or more second keywords, which are semantically contained by the above abstract keyword, are output as concrete keywords.

More specifically, the present invention relates to a keyword inferring device, characterized in comprising keyword acquisition means which acquires a predetermined keyword based on predetermined character strings, obtained from user operations; abstract keyword acquisition means, which acquires an abstract keyword which semantically contains the above keyword, based on the predetermined keyword obtained by the above keyword acquisition means; and concrete keyword acquisition means, which acquires concrete keywords semantically contained by the above abstract keywords, based on the abstract keywords obtained by the above abstract keyword acquisition means.

The above keyword acquisition means is characterized in analyzing the above predetermined character string into word units, judging whether the above analyzed words exist in a predetermined dictionary, and, if the above analyzed words exist in the predetermined dictionary, acquiring the above words as predetermined keywords.

The above abstract keyword acquisition means is characterized in taking the above predetermined keyword as an input keyword, judging whether the above input keyword exists

in the predetermined dictionary; if it is judged that the above input keyword exists in the predetermined dictionary, judging whether the above predetermined dictionary defines an abstract keyword with respect to the above input keyword; and, if it is judged that the above predetermined dictionary defines an abstract keyword with respect to the above input keyword, outputting the above abstract keyword.

Further, the above abstract keyword acquisition means is characterized in outputting an abstract keyword based on a predetermined explanatory text and predetermined text file defined by the above predetermined dictionary for the above input keyword, in cases where it is judged that the above predetermined dictionary defines an abstract keyword with respect to the above input keyword.

The above concrete keyword acquisition means is characterized in taking the above abstract keyword as an input keyword, and judging whether the above input keyword exists in the predetermined dictionary; if the above input keyword is judged to exist in the predetermined dictionary, judging whether the above predetermined dictionary defines [one or more] concrete keywords with respect to the above input keyword; and, if it is judged that the above predetermined dictionary defines [one or more] concrete keywords with respect to the above input keyword, outputs the above concrete keywords. The above concrete keyword acquisition means is further characterized in that, if it is judged that the above predetermined dictionary defines a concrete keyword with

respect to the above input keyword, a concrete keyword is output based on a predetermined explanatory text and predetermined text file defined by the above predetermined dictionary for the above input keyword.

The above keyword inferring device may also compute an occurrence rate for each acquired abstract keyword acquired by the above abstract keyword acquisition means, and acquire the above concrete keywords based on abstract keywords for which the above occurrence rate is equal to or greater than a predetermined value.

The present invention relates to a keyword inferring device, which infers keywords based on hierarchically configured frame data, and is characterized in comprising first presentation means, which presents a search condition input screen; first acceptance means, which accepts first input information obtained by user operation of the above search condition input screen; second presentation means, which performs a search based on the above first input information, and presents a search result output screen; second acceptance means, which accepts second input information obtained by user operation of the above search result output screen; and construction means, which configures first frame data based on the above first input information, and configures second frame data, positioned on a level below the above first frame data, based on the above second input information.

The present invention also relates to a program which realizes the predetermined functions in a computer, or recording media on which is recorded such a program. That is, the present invention relates to recording media on which is recorded a program which realizes predetermined functions on a computer, characterized in that the above program comprises keyword acquisition means, which acquires a predetermined keyword based on a predetermined character string obtained by user operation; abstract keyword acquisition means, which acquires an abstract keyword semantically containing the above keyword based on the keyword acquired by the above keyword acquisition means; and concrete keyword acquisition means, which acquires a concrete keyword semantically contained by the above abstract keyword, based on the abstract keyword acquired by the above abstract keyword acquisition means.

BRIEF DESCRIPTION OF THE DRAWINGS

Fig. 1 is a block diagram showing the overall configuration of a keyword inferring system;

Fig. 2 is a figure showing one example of frame data;

Fig. 3 is a block diagram showing the detailed configuration of a keyword inferring unit;

Fig. 4 is a partial flowchart used to explain the operation and processing of the inference execution unit;

Fig. 5 is a partial flowchart used to explain the operation and processing of the inference execution unit;

Fig. 6 is a partial flowchart used to explain the operation and processing of the inference execution unit;

Fig. 7 is a partial flowchart used to explain the operation and processing of the inference execution unit;

Fig. 8 is a partial flowchart used to explain the operation and processing of the inference execution unit;

Fig. 9 is a flowchart used to explain the operation and processing of the keyword acquisition unit;

Fig. 10 is a partial flowchart used to explain the operation and processing of the abstract keyword acquisition unit;

Fig. 11 is a partial flowchart used to explain the operation and processing of the abstract keyword acquisition unit;

Fig. 12 is a figure showing one example of data comprised by a search object dictionary;

Fig. 13 is a flowchart used to explain the operation and processing of the concrete keyword acquisition unit;

Fig. 14 is a flowchart used to explain the operation and processing of the concrete keyword acquisition unit;

Fig. 15 is a flowchart used to explain the operation and processing of the keyword occurrence counting unit;

Fig. 16 is a figure showing one example of a search condition setting screen;

Fig. 17 is a figure showing one example of a search result display screen; and,

Fig. 18 is a figure showing one example of a recommendation screen.

BEST MODE FOR CARRYING OUT THE INVENTION

Next, aspects of this invention are explained, referring to the drawings.

Fig. 1 is a block diagram showing the overall configuration of a keyword inferring system of this embodiment. As shown in the figure, the keyword inferring system comprises an input unit 11; display unit 12; interface agent 13; dictionary database 14; frame generation unit 15; frame database 16; keyword inferring unit 17; inference result frame generation unit 18; inference result frame database 19; content expression unit 20; and content database 21. This keyword inferring system typically is configured as a client/server system connected to the Internet.

The input unit 11 typically comprises a keyboard and mouse or similar, to enable the input of predetermined information through user operations. The display unit 12 typically is a display monitor or similar, for presenting predetermined information to the user. By this means, the input unit 11 and display unit 12 realize a user interface for the user to perform interactive operations.

The interface agent 13 performs suitable processing and passes information input via the input unit 11 to internal

means, while referring to the dictionary DATABASE 14, and suitably processes and sends to the display unit 12 information passed from internal means. Specifically, the interface agent 13 analyzes input natural-language character strings into words, and performs semantic analysis; in addition, analyzed words are converted into common terms using a thesaurus. The interface agent 13 outputs text in order to respond to the user, based on the obtained search result. The dictionary DATABASE 14 has a dictionary for text analysis, a dictionary in which are recorded terms in different fields, and similar.

The frame generation unit 15 creates frame data having a predetermined data structure based on information input from the input unit 11, and registers this frame data with the frame DATABASE 16. The frame generation unit 15 creates frame data based on, for example, a search reason (purpose) input by the user, or information relating to user operation trends. Fig. 2 is a figure showing one example of frame data. In this figure, the frame data is configured as combinations of slot names and slot values. Below, frame data positioned in the higher hierarchical level is called a parent frame, and frame data positioned in a hierarchical level one lower than this is called a child frame. In this embodiment, frame data constructed from information obtained from search conditions input by the user is taken to be a parent frame, and frame data constructed from information obtained by selection by the user is taken to be a child frame. A pointer indicating

content referenced by the user is stored in the "objective" in a child frame.

The keyword inferring unit 17 infers a keyword thought to have high relevance based on keywords contained in the title in the content specified by the object in the child frame constructed from information input using the input unit 11, and passes the inference result to the inference result frame generation unit 18. The keyword inferring unit 17 acquires a keyword from the title in the content, specifies a keyword (hereafter "abstract keyword") semantically containing this keyword, further specifies a keyword (hereafter "concrete keyword") semantically contained by this abstract keyword, and outputs the concrete keyword. The details of this keyword inferring unit 17 are described below.

The inference result frame generation unit 18 creates frame data (hereafter "inference result frame") having a predetermined data structure. Here, the keyword received from the keyword inferring unit 17 is also stored. The inference result frame generation unit 18 registers the created inference result frame in the inference result frame database 19, and sends this to the content expression unit 20.

The content expression unit 20 extracts content for presentation to the user from the content database 21, based on the inference result frame registered in the inference result frame database. In doing so, the "narrowing conditions" and "narrowing condition execution order" which are slots in the inference result frame are used to execute

narrowing conditions in the order of priority, until the target content number (specified by the user, or otherwise obtained) is reached, to perform narrowing of the number of extracted items.

Fig. 3 is a block diagram showing the detailed configuration of the keyword inferring unit 17. In the figure, the inference execution unit 31 performs inference processing to specify a concrete keyword from a child frame in which is stored a pointer indicating content referenced by the user. The inference execution unit 31 performs inference processing, calling as appropriate the keyword acquisition unit 32, abstract keyword acquisition unit 33 and concrete keyword acquisition unit 34 in the course of inference processing. The keyword acquisition unit 32 receives a character string for keyword analysis as a first argument and a dictionary name for use as a second argument, and outputs a main keyword character string array and complementary keyword character string array. Specifically, the keyword acquisition unit 32 analyzes an input character string into words; judges whether the analyzed words exist in the dictionary specified by the second argument; if they do exist, appends the words as main keywords to a main keyword character string array for output; and, if they do not exist, appends them as complementary keywords to a complementary keyword character string array for output. The keyword occurrence counting unit 35 adds the main keyword character strings and complementary keyword character strings obtained from the keyword acquisition unit 32 in this

cycle to the keyword occurrence counters of all child frames managed by the parent frame. The abstract keyword acquisition counter 33 receives a character string for abstract keyword acquisition as a first argument and a dictionary name for use as a second argument, and outputs an abstract keyword character string array. That is, the abstract keyword acquisition unit 33 performs abstraction of the provided keyword, and acquires a corresponding abstract keyword character string array. Here "to perform keyword abstraction" means, for a given keyword, to specify another keyword which semantically contains the given keyword. In other words, abstraction involves specifying one or more (preferably a plurality of) keywords positioned, conceptually, above the given keyword. The concrete keyword acquisition unit 34 receives a character string for concrete keyword acquisition as a first argument and a dictionary name for use as a second argument, and outputs a concrete keyword. That is, the concrete keyword acquisition unit 34 performs concretion of a given keyword, and acquires one or more (preferably a plurality of) concrete keywords. Here "to perform keyword concretion" means, for a given keyword, to identify one or more (preferably a plurality of) other keywords which are semantically contained by the given keyword. In other words, concretion involves identifying one or more (preferably a plurality of) keywords positioned, conceptually, below the given keyword.

Fig. 4 through Fig. 8 are flowcharts used to explain the operation and processing of the inference execution unit 31. The inference execution unit 31 receives as arguments a parent frame pointer, and array index starting and ending numbers for the child frame which is the object of keyword inferring in this cycle. In this case, if the main keyword in the "content" is null, the inference execution unit 31 acquires the main keyword and complementary keywords from the title of the "content". That is, the inference execution unit 31 judges whether the main keyword in the "content" indicated by the pointer stored in the "object" of the child frame is null (step 401 in Fig. 4). If the inference execution unit 31 judges that the main keyword is null, the keyword acquisition unit 32 is called, with the title of the "content" as argument, and the main keyword and complementary keywords are acquired (step 402). If it is judged that the main keyword is not null, the main keyword and complementary keyword of the "content" are acquired.

Next, the keyword occurrence counting unit 35 is called (step 403), with the parent frame pointer as the first argument, and as the second argument the pointer array of a character string array, having as elements the pointers of the main keyword character string array in which acquired main keywords are stored and the complementary keyword character string array pointer in which are stored acquired complementary keywords. The keyword occurrence counting unit 35 uses the second argument to add the number of occurrences

of the main keyword and complementary keywords acquired in this cycle to the occurrence counters for main keywords and complementary keywords managed by the parent frame.

The inference execution unit 31 performs steps 401 to 403 for all of the child frames which are subjected to keyword inference in this cycle.

Next, the inference execution unit 31 uses the main keyword and complementary keyword occurrence counters managed by the parent frame to compute occurrence rates for each keyword, and stores the results in the main keyword occurrence rate association array and complementary keyword occurrence rate association array managed by the parent frame (step 404). Here it is assumed that

Occurrence rate = Number of keyword occurrences/Number of child frames

That is, it may be said that the smaller the occurrence rate for a keyword, the less the interest of the user.

Next, the inference execution unit 31 creates a character string array in which are stored all main keywords, and a character string array for abstract keyword storage is declared (step 405 in Fig. 5). For all main keywords, a judgment is made as to whether the occurrence rate is equal to or greater than a predetermined value (for example, 80%) (step 406). If there exists a keyword with an occurrence rate equal to or greater than the predetermined value, the main keyword is appended to the character string array for abstract keyword

storage in order to enable use as an abstract keyword, and the main keyword is deleted from the character string array created in step 405 in which main keywords are stored (step 407). Steps 406 and 407 are executed for all main keywords. Next, a judgment is made as to whether elements exist in the character string array in which main keywords are stored of step 405. If elements exist, processing proceeds to step 409; if no elements exist, processing jumps to step 416, shown in Fig. 7 (step 408).

The inference execution unit 31 declares an association array for computation of abstract keyword occurrence rates (step 409), and for all elements of the character string array in which the above-described main keywords are stored, the inference execution unit 31 calls the abstract keyword acquisition unit 33, with each element as an argument, and acquires abstract keywords (a character string array) (step 410 in Fig. 6). The inference execution unit 31 judges whether each acquired abstract keyword exists in the association array for computation of abstract keyword occurrence rates of step 409 (step 411). If the keyword exists, the occurrence rate of the main keyword that is the argument in step 410 is added to the Value corresponding to Key (the abstract keyword) (step 412). If the keyword does not exist, the abstract keyword is appended to Key of the association array for computation of abstract keyword occurrence rates, while the occurrence rate of the main

keyword, which was the argument in step 410, is appended to Value of the association array (step 413).

Next, the inference execution unit 31 judges, for all the elements of the association array for computation of abstract keyword occurrence rates, whether there exists an abstract keyword the occurrence rate of which is equal to or greater than a predetermined value (for example, 80%) (step 414 in Fig. 7). If there exists a keyword the occurrence rate of which is equal to or greater than the predetermined value, the inference execution unit 31 appends the abstract keyword to the abstract keyword character string array of step 405 (step 415). Next, the inference execution unit 31 judges whether there exists an element in the abstract keyword character string array of step 405 (step 416). If no element exists, the inference execution unit 31 calls the inference result frame generation unit, with the main keyword occurrence rate association array of the parent frame as an argument, and terminates (step 421). If an element exists, a character string array for concrete keyword storage is declared (step 417). For all elements of the abstract keyword character string array, the concrete keyword acquisition unit 34 is called, with an abstract keyword as an argument, and concrete keywords are acquired (step 418 in Fig. 8). Then, the inference execution unit 31 judges, for all the acquired concrete keywords, whether there exists an element in the character string array for concrete keyword storage (step 419); if no element exists, the keyword is appended to the

character string array for concrete keyword storage (step 420). The inference execution unit 31 then calls the inference result frame generation unit 18, with the character string array for concrete keyword storage as an argument (step 422).

Fig. 9 is a flowchart used to explain the operation and processing of the keyword acquisition unit 32. When the keyword acquisition unit 32 receives a character string as a first argument and a dictionary for searching as a second argument, the character string of the first argument is analyzed into words, which are stored in a character string array (step 901). The keyword acquisition unit 32 then judges whether the analyzed words exist in the dictionary for searching specified as the second argument (step 902), and, if a word is judged to exist in the dictionary for searching, sets the word in the main keyword character string array (step 903), and sets a pointer to the leading address of the main keyword character string array in the main keyword of the content indicated by the object of the child frame (step 904). On the other hand, if it is judged not to exist in the dictionary for searching, the word is set in the complementary keyword character string array (step 905), and the pointer to the leading address of the complementary keyword character string array is set in the complementary keyword of the content indicated by the object of the child frame (step 904). The keyword acquisition unit 32 repeats the above processing in order from the first element to the last element of this character string array.

Fig. 10 and Fig. 11 are flowcharts used to explain the operation and processing of the abstract keyword acquisition unit 33. The abstract keyword acquisition unit 33 receives, from the inference execution unit 31, a keyword for abstract keyword acquisition as a first argument; a dictionary for searching as a second argument; and a character string representing a viewpoint as a third argument. This viewpoint is used to handle polysemous terms. The abstract keyword acquisition unit 33 first reads a text file for abstract keyword acquisition, and stores it in a character string array (step 1001). The text file for abstract keyword acquisition is a collection of templates such as, for example, "one kind of A", "relating to A", "an A for the purpose of B", or "approximately A" (nouns and noun clauses, and similar), where the "A" portion represents the abstract keyword. The abstract keyword acquisition unit 33 judges whether the keyword of the first argument exists in the dictionary for searching specified in the second argument (step 1002), and if it is judged to exist in the dictionary for searching, then judges whether the character string representing a viewpoint specified by the third argument is null (step 1003). In step 1002, if it is judged that the keyword of the first argument does not exist in the dictionary for searching specified in the second argument, the abstract keyword acquisition unit 33 terminates processing. Fig. 12 shows one example of data comprised by a search object dictionary. If in step 1003 the character string is judged to be null, the abstract keyword

acquisition unit 33 acquires the ViewPoint class for which relevance is highest (step 1004). Relevance is a numerical value indicating the degree of connection between two words; here, the larger the value, the more connected are the two words. On the other hand, if in step 1003 the character string is judged to be other than null, the abstract keyword acquisition unit 33 acquires the ViewPoint class having the same viewpoint name as the third argument (step 1005). Next, the abstract keyword acquisition unit 33 judges whether the abstract word property of the keyword in the dictionary is null (step 1006). If the abstract keyword acquisition unit 33 judges the abstract word property to be other than null, words indicated by lower nodes are sorted in descending order of the relevance property of lower nodes specified by the abstract word property (step 1007), and the acquired character string array is output as an abstract keyword character string array (step 1008).

On the other hand, if in step 1006 it is judged that the abstract word property is not null, the abstract keyword acquisition unit 33 reads the dictionary explanatory text for the data (step 1009 in Fig. 11). Then, the abstract keyword acquisition unit 33 judges, in order for each element from the first to the last element of the character string array in which the text for abstract keyword acquisition is stored, whether there is a matching item in the dictionary explanatory text which has been read (step 1010). If the abstract keyword acquisition unit 33 judges that there is a matching item, the

keyword acquisition unit 32 is called with this word as an argument (step 1011). By this means, the abstract keyword acquisition unit 33 judges whether there exists an element in the main keyword character string array (step 1012). If an element is judged to exist, the element is output as an abstract keyword (step 1013).

Fig. 13 and Fig. 14 are flowcharts used to explain the operation and processing of the concrete keyword acquisition unit 34. When the concrete keyword acquisition unit 34 receives from the inference execution unit 31 an abstract keyword for concrete keyword acquisition, as a first argument, a dictionary for searching, as a second argument, and a character string representing a viewpoint, as a third argument, it reads a text file for concrete keyword acquisition, and stores it in a character string array (step 1301). The text file for concrete keyword acquisition is a collection of templates such as, for example, "representative examples are A, B, C, D, ...", "for example, A, B, C, D, ...", "concretely, A, B, C, D, ...", and "approximately A, B, C, D, ...", where the portions "A", "B", "C", "D" represent concrete keywords. The concrete keyword acquisition unit 34 judges whether the keyword of the first argument exists in the dictionary for searching specified by the second argument (step 1302), and if it is judged that the keyword exists in the dictionary for searching, then judges whether the character string representing a viewpoint of the third argument is null (step 1303). In step 1302, if it is judged that the keyword of the

first argument does not exist in the dictionary for searching specified by the second keyword, then the concrete keyword acquisition unit 34 terminates processing. In step 1303, if the character string is judged to be null, the concrete keyword acquisition unit 34 acquires the ViewPoint class for which relevance is highest (step 1304). On the other hand, if in step 1303 the character string is judged to be other than null, the concrete keyword acquisition unit 34 acquires a ViewPoint class having the same viewpoint as the third argument (step 1305). Next, the concrete keyword acquisition unit 34 judges whether the concrete word property of the keyword in the dictionary is null (step 1306). If the concrete keyword acquisition unit 34 judges the concrete word property to be other than null, it sorts the words indicated by lower nodes, in descending order of the relevance property of lower nodes specified by the concrete word property (step 1307), and the acquired character string array is output as a concrete keyword character string array (step 1308).

On the other hand, if in step 1306 the concrete word property is judged to be null, the concrete keyword acquisition unit 34 reads the dictionary explanatory text for the data (step 1309). Then, the concrete keyword acquisition unit 34 judges, in order for each element from the first to the last element of the character string array in which the text for concrete keyword acquisition is stored, whether there is a matching item in the dictionary explanatory text which has been read (step 1310). If the concrete keyword

acquisition unit 34 judges that there is a matching item, the keyword acquisition unit 32 is called with this word as an argument (step 1311). By this means, the concrete keyword acquisition unit 33 judges whether there exists an element in the main keyword character string array (step 1312). If an element is judged to exist, the element is output as an concrete keyword (step 1313).

Fig. 15 is a flowchart used to explain the operation and processing of the keyword occurrence counting unit 35. When the keyword occurrence counting unit 35 receives, from the keyword acquisition unit 32, a parent frame as a first argument, and as the second argument a pointer array in which are stored, as the first and second elements, a pointer indicating a main keyword character string array and a complementary keyword character string array, it judges whether, for all the main keywords specified by the second argument, whether the main keyword exists in the main keyword occurrence counter of the parent frame (step 1501). If it does exist, increments by one the value of the main keyword occurrence counter (step 1502); and if it does not exist, appends to the main keyword occurrence counter a new element with the main keyword as Key and 1 as Value (step 1503). Next, the keyword occurrence counting unit 35 judges whether, for all complementary keywords specified by the second argument, whether the complementary keyword exists in the complementary keyword occurrence counter of the parent frame (step 1504); if it does exist, increments by one the value of the

complementary keyword occurrence counter (step 1505). If it does not exist, appends to the complementary keyword occurrence counter a new element with the complementary keyword as Key and 1 as Value (step 1506).

As explained above, by means of this aspect, when the keyword inferring unit 17 receives an input character string, it analyzes the character string into words, identifies an abstract keyword for each of these words, and outputs concrete keywords according to [each of] these abstract keywords.

The above aspect is an example for the purpose of explaining this invention, and the present invention is not limited to the above aspect. This invention can be implemented in a variety of aspects, so long as there is no deviation from the gist of the invention. For example, the operation of the above functional means were explained sequentially, but this is not a requirement. Hence so long as no contradictions in operation occur, a configuration may be used in which the order of processing is altered, or operations are performed in parallel.

Embodiment

Next, an example of application of the keyword inferring system of this invention to a system which recommends books to users is explained.

Suppose that the user inputs required items into a search conditions settings screen shown in Fig. 16, and selects the "Search" button. The keyword inferring system creates parent

frame data based on the input information, performs a search according to the search conditions, and presents the search results display screen shown in Fig. 17 to the user. In this case, suppose that in order to view detailed information on "1" and "3", which appear to be related to the list of books for which the user is searching, and so selects the "Details" buttons in order. Through this action of the user, data for a child frame as the child of the parent frame data is created in order. The keyword inferring system is executed each time child frame data is created, and ultimately detailed information on books inferred from the parent frame data is presented in a recommendation screen.

The keyword inferring system receives the first user input (the selection of "1"), and first analyzes the book title "The Road to C++" into the words "C++" and "road", and judges whether each of these words exists in a computer dictionary. By this means, the keyword inferring system acquires "C++" as a main keyword and "road" as a complementary keyword, and computes the occurrence rates of each.

Next, the keyword inferring system attempts to acquire an abstract keyword based on this "C++" main keyword; here, the occurrence rate of the "C++" main keyword is 100%, and so "C++" is initially stored as an abstract keyword. Then, user input (the selection of "3") is received, the book title "Winston's Smalltalk" is analyzed into the words "Winston" and "Smalltalk", and a judgment as to whether each of these exists in the computer dictionary is made. In this way, the keyword

inferring system acquires "Smalltalk" as a main keyword and "Winston" as a complementary keyword, and computes the occurrence rates of each. Next, the keyword inferring system judges that the occurrence rates of the two acquired main keywords are not greater than the 80% rate defined in advance. In this case, because the rates are not greater than 80%, abstract keywords for the two main keywords are obtained. In this example, the abstract keyword "object-oriented language" is derived from "C++", and the abstract keyword "object-oriented language" is derived from "Smalltalk". Then, from the keyword "object-oriented language" obtained in this way, a concrete keyword, for example, "Java", is derived.

When the keyword inferring system acquires the concrete keyword "Java", books related to "Java" are recommended as books which are likely to be desired by the user, as shown in Fig. 18.

As described above, by means of this invention a keyword inferring system can be provided which infers appropriate keywords for searches based on input keywords. Hence by performing database searches according to inferred keywords, information resources which are truly useful to the user can be efficiently provided.

As the specific range of applicability of this invention, in addition to provision of information on books, music, movies, gifts, travel, automobiles, housing, job searches, financial products, computers, and all other areas, this application can also be applied to tasks in areas other than

information provision, such as counseling, medical examination, diagnoses, and consulting.

(Article 34 amendments)

CLAIMS

1. (Amended) A keyword inferring device, wherein, based on a predetermined keyword acquired by user operation, an abstract keyword which semantically contains the keyword is acquired, and, based on said abstract keyword, one or more concrete keywords which are semantically contained by the abstract keyword are acquired.

2. (Amended) An inferring device, comprising:

keyword acquisition means, which acquires a predetermined keyword from user operation;

abstract keyword acquisition means, which, based on said predetermined keyword, acquires an abstract keyword which semantically contains the keyword; and,

concrete keyword acquisition means, which, based on said abstract keyword, acquires a concrete keyword which is semantically contained by the abstract keyword.

3. (Amended) The inferring device according to Claim 2, characterized in that said keyword acquisition means analyzes a predetermined character string into word units; judges whether said analyzed words exist in a predetermined dictionary; and, if it is judged that said analyzed words exist in the predetermined dictionary, acquires said words and said predetermined keywords.

4. The inferring device according to Claim 2, characterized in that said abstract keyword acquisition means

takes said predetermined keyword as an input keyword; judges whether said input keyword exists in a predetermined dictionary; if it is judged that said input keyword exists in the predetermined dictionary, judges whether said predetermined dictionary defines an abstract keyword for said input keyword; and, if it is judged that said predetermined dictionary defines an abstract keyword for said input keyword, outputs said abstract keyword.

5. The inferring device according to Claim 4, characterized in that, if it is judged that said predetermined dictionary does not define an abstract keyword for said input keyword, said abstract keyword acquisition means outputs an abstract keyword based on predetermined explanatory text and a predetermined text file defined by said predetermined dictionary for said input keyword.

6. The inferring device according to Claim 2, characterized in that said concrete keyword acquisition means takes said abstract keyword as an input keyword; judges whether said input keyword exists in a predetermined dictionary; if it is judged that said input keyword exists in the predetermined dictionary, judges whether said predetermined dictionary defines a concrete keyword for said input keyword; and, if it is judged that said predetermined dictionary defines a concrete keyword for said input keyword, outputs said concrete keyword.

7. The inferring device according to Claim 6, characterized in that, if it is judged that said predetermined

dictionary does not define a concrete keyword for said input keyword, said concrete keyword acquisition means outputs a concrete keyword based on predetermined explanatory text and a predetermined text file defined by said predetermined dictionary for said input keyword.

8. The inferring device according to Claim 2, characterized in that said inferring device computes an occurrence rate for each abstract keyword acquired by said abstract keyword acquisition means, and said concrete keyword acquisition means acquires said concrete keyword based on an abstract keyword for which said occurrence rate is equal to or greater than a predetermined value.

9. (Amended) An inferring device, comprising:

first presentation means, which presents a search conditions input screen;

first reception means, which receives first input information obtained by user operation on said search conditions input screen;

second presentation means, which performs a search based on said first input information, and presents a search results output screen;

second reception means, which receives second input information obtained by user operation on said search results output screen; and,

configuration means, which configures a first frame based on said first input information, and configures a second frame,

positioned below said first frame, based on said second input information;

and constituted such that,

from a keyword contained in said second frame, an abstract keyword semantically containing the keyword is acquired; and,

from said abstract keyword, one or more concrete keywords, semantically contained by the abstract keyword, are acquired.

10. (Amended) A keyword inferring method, characterized in that

from a keyword generated based on operations by a user, an abstract keyword which semantically contains the keyword is acquired; and,

from said abstract keyword, one or more concrete keywords which are semantically contained by the abstract keyword are acquired.

11. (Amended) Recording media on which is recorded a program which realizes predetermined functions in a computer, characterized in that said program comprises:

a keyword acquisition function, which acquires a keyword based on user operation;

an abstract keyword acquisition function, which, from said keyword, acquires an abstract keyword which semantically contains the keyword; and,

a concrete keyword acquisition function, which, from said abstract keyword, acquires a concrete keyword which is semantically contained by the abstract keyword.

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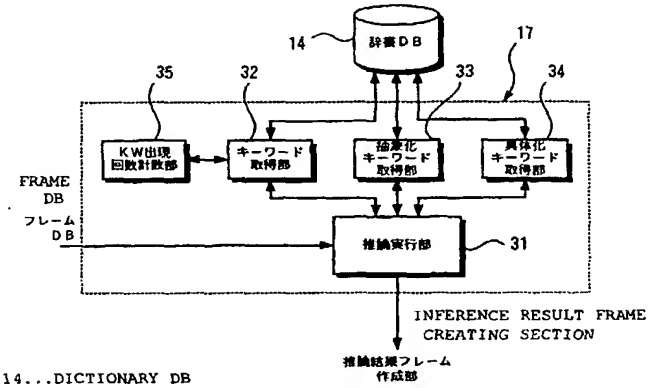
— 補正書

(54) Title: KEYWORD INFERRING DEVICE AND KEYWORD INFERRING METHOD

(54) 発明の名称: キーワード推論装置およびキーワード推論方法



14...DICTIONARY DB
35...KW APPEARANCE COUNTING SECTION
32...KEYWORD ACQUIRING SECTION
33...ABSTRACETED KEYWORD ACQUIRING SECTION
34...EMBODIED KEYWORD ACQUIRING SECTION
31...INFERRING SECTION

(57) Abstract: A group of keywords used as clues for searching an information resource for each broadly defined genre. A dictionary in which the keywords are correlated with each other in relation between abstract and embodiment in each genre is prepared. Referring to the dictionary, an information resource in which the user may be interested is inferred using the action log when the user has accessed a web site and keywords included in the information resource which the user has accessed and presented. A keyword-inferring device specifies an abstracted keyword semantically including a keyword inputted by the user according to the inputted keyword and outputs another keyword which the abstracted keyword semantically includes as an embodied keyword. A suitable keyword for search is inferred from the inputted keyword, and an information resource truly useful to the user is efficiently provided.

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WO 01/13269 A1

FIG.1

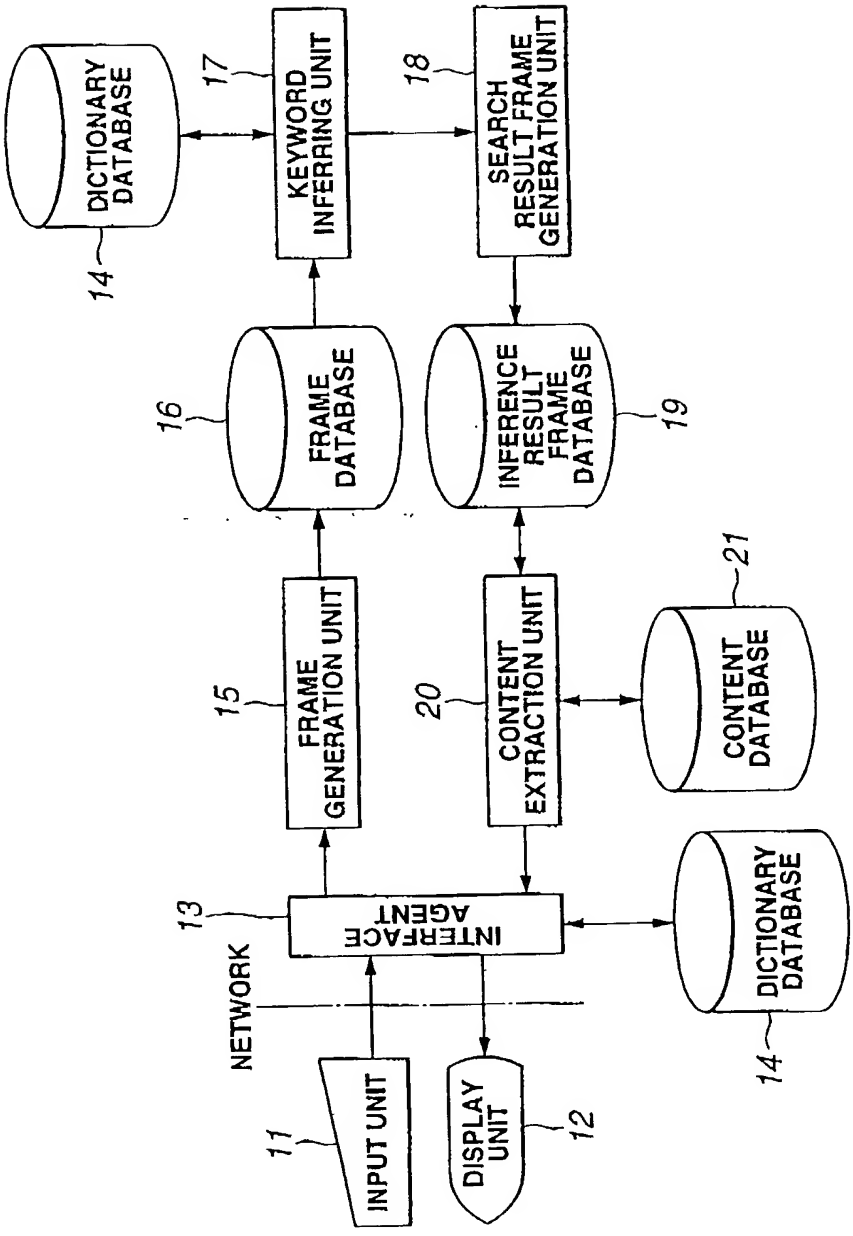

DICTIONARY DATABASE
14
KEYWORD INFERRING UNIT
17
SEARCH RESULT FRAME GENERATION UNIT
18
FRAME DATABASE
16
INFERENCE RESULT FRAME DATABASE
19
FRAME GENERATION UNIT
15
CONTENT EXTRACTION UNIT
20
CONTENT DATABASE
21
INTERFACE AGENT
13
NETWORK
DICTIONARY DATABASE
14
INPUT UNIT
11
DISPLAY UNIT
12

FIG.2

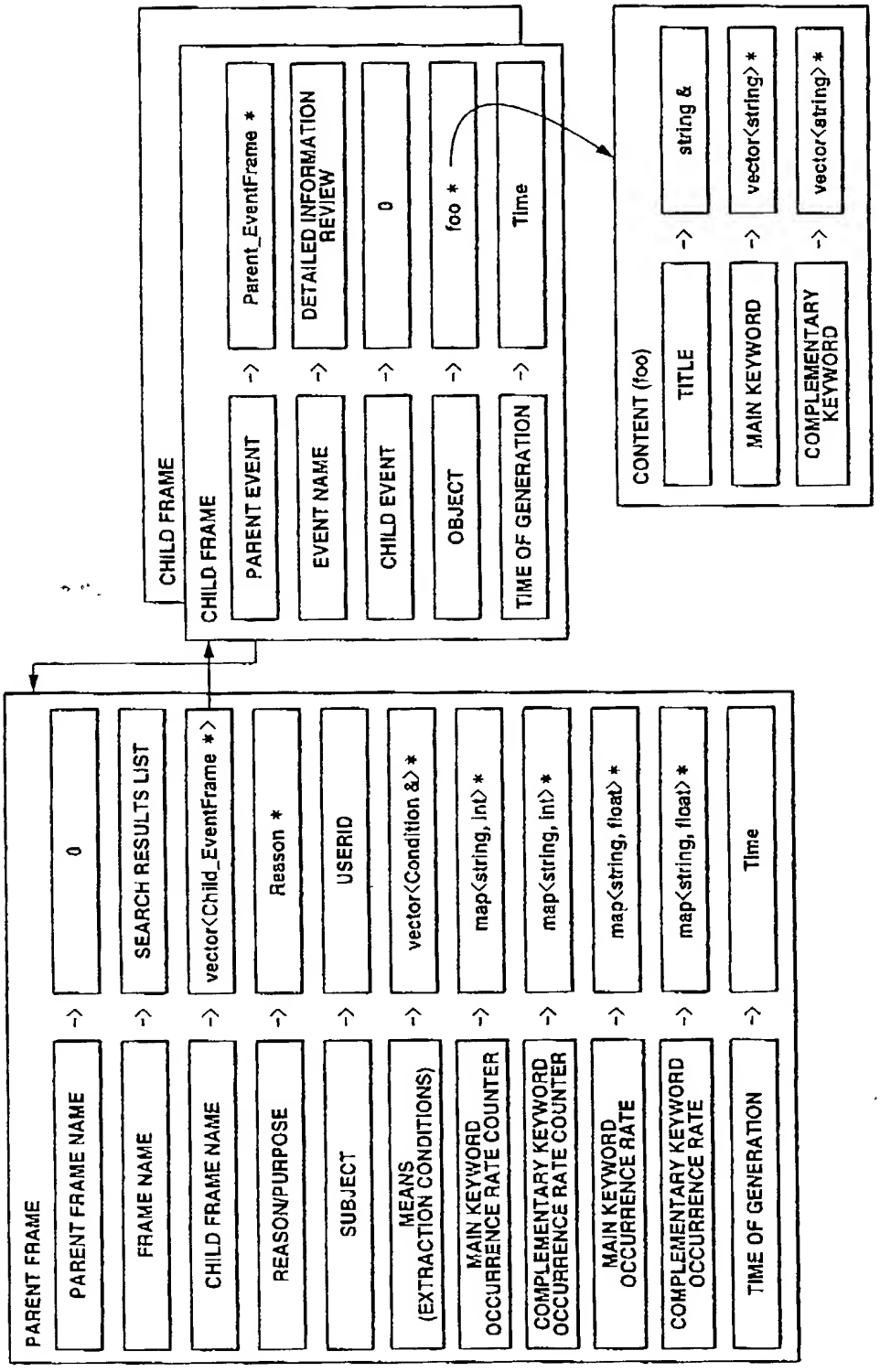

PARENT FRAME
PARENT FRAME NAME
FRAME NAME
CHILD FRAME NAME
REASON/PURPOSE
SUBJECT
MEANS (EXTRACTION CONDITIONS)
MAIN KEYWORD OCCURRENCE RATE COUNTER
COMPLEMENTARY KEYWORD OCCURRENCE RATE COUNTER
MAIN KEYWORD OCCURRENCE RATE
COMPLEMENTARY KEYWORD OCCURRENCE RATE
TIME OF GENERATION
0
SEARCH RESULTS LIST
vector<Child_EventFrame *>
Reason *
USERID
vector<Condition &> *
map<string, int> *
map<string, int> *
map<string, float> *
map<string, float> *
Time
CHILD FRAME
CHILD FRAME
PARENT EVENT
EVENT NAME
CHILD EVENT
OBJECT
TIME OF GENERATION
Parent_EventFrame *
DETAILED INFORMATION REVIEW
0
foo *
Time
CONTENT (foo)
TITLE
MAIN KEYWORD
COMPLEMENTARY KEYWORD
string &
vector<string> *
vector<string> *

FIG.3

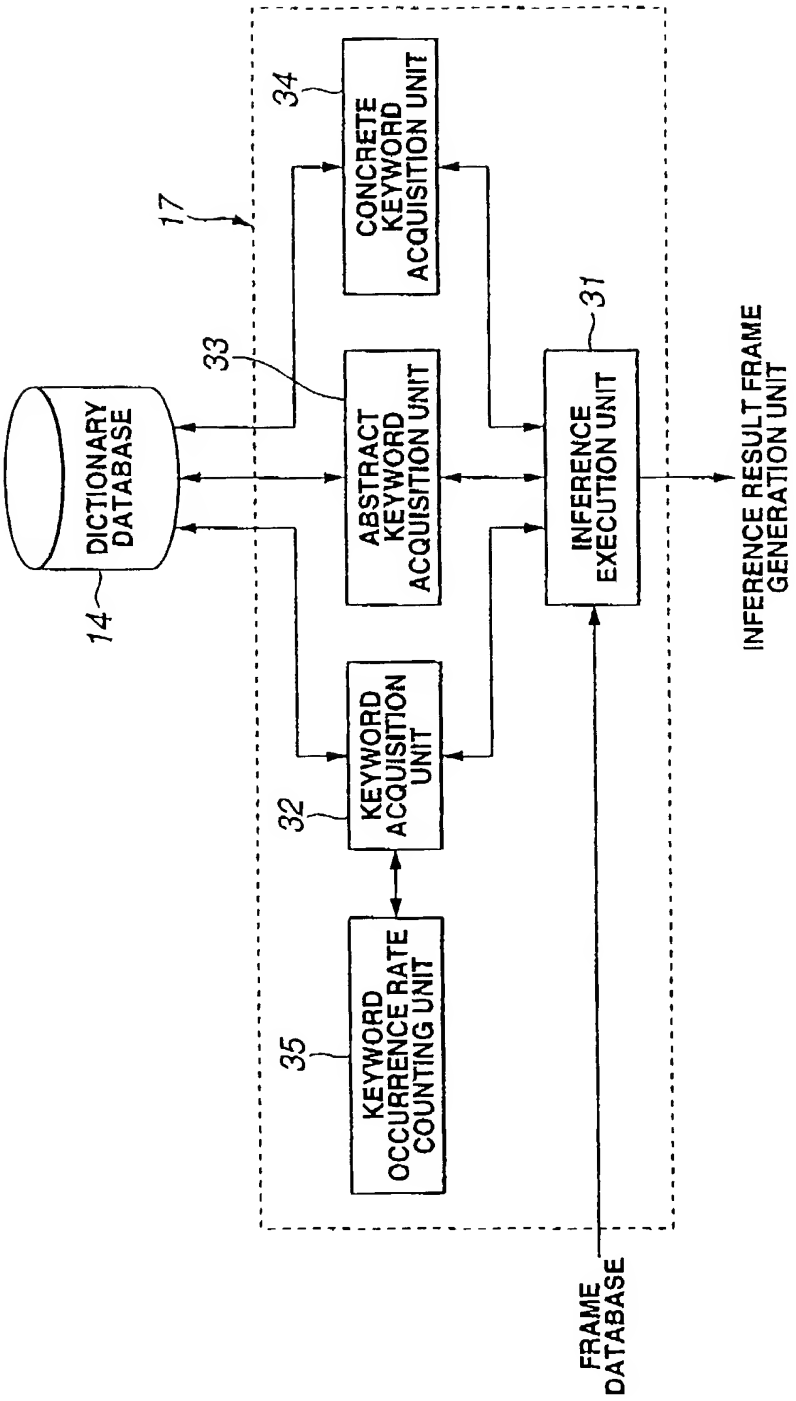


FIG.4

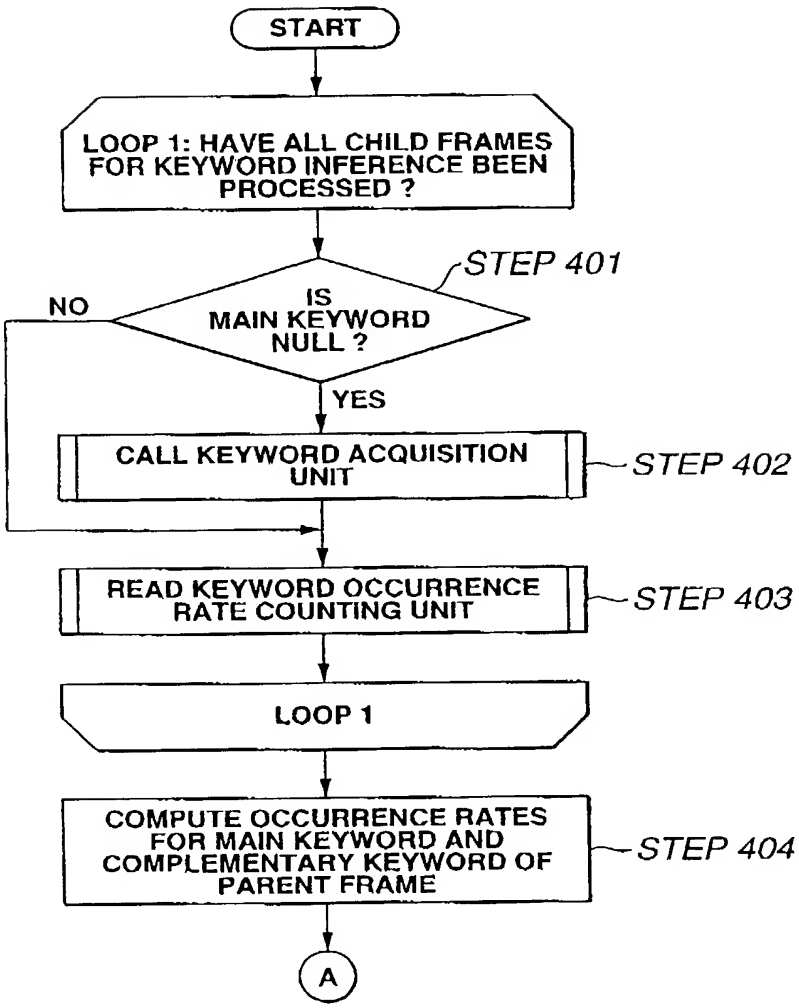

START
LOOP 1: HAVE ALL CHILD FRAMES FOR KEYWORD INFERENCE BEEN PROCESSED ?
STEP 401
IS MAIN KEYWORD NULL ?
NO
YES
CALL KEYWORD ACQUISITION UNIT
STEP 402
READ KEYWORD OCCURRENCE RATE COUNTING UNIT
STEP 403
LOOP 1
COMPUTE OCCURRENCE RATES FOR MAIN KEYWORD AND COMPLEMENTARY KEYWORD OF PARENT FRAME
STEP 404
A

FIG.5

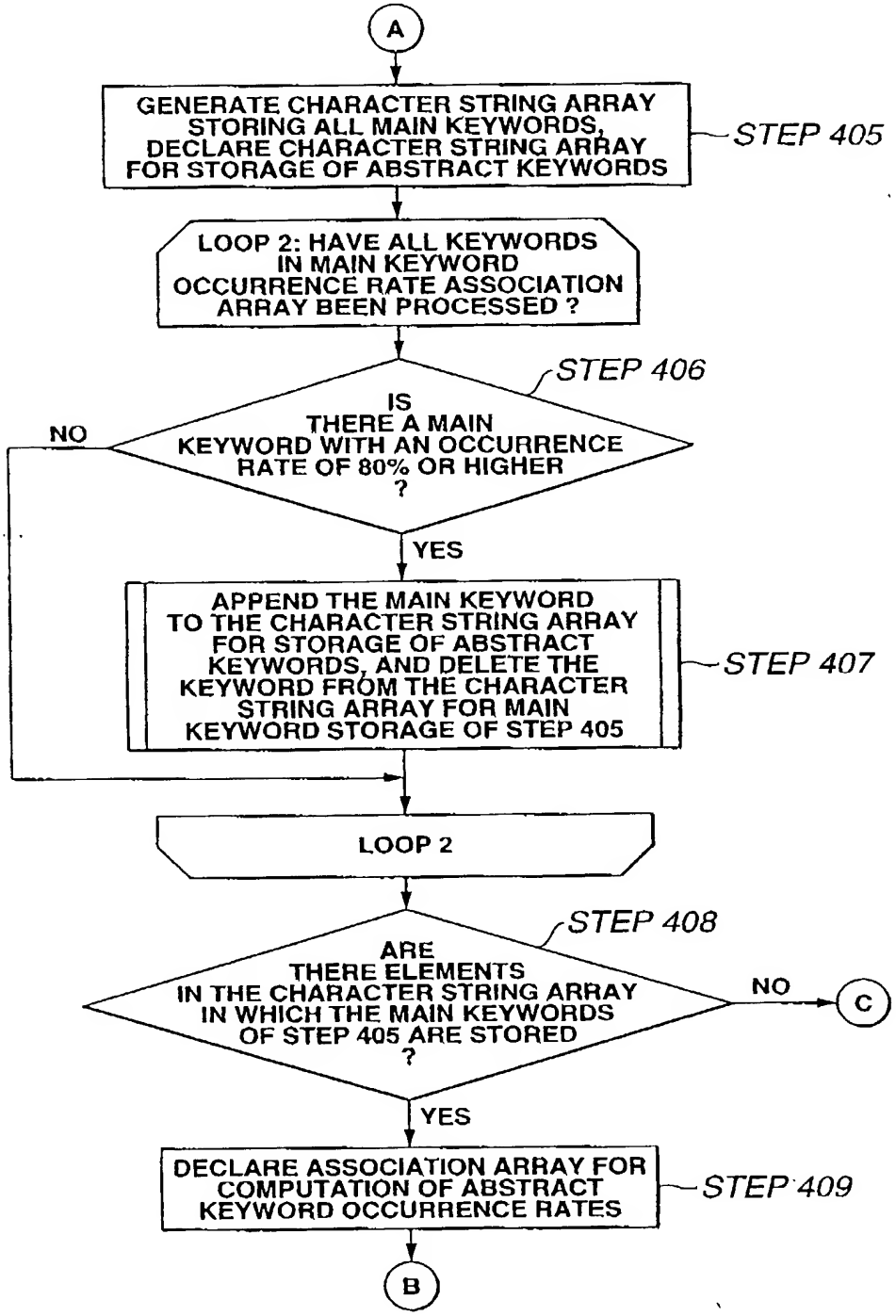

A
GENERATE CHARACTER STRING ARRAY STORING ALL MAIN KEYWORDS, DECLARE CHARACTER STRING ARRAY FOR STORAGE OF ABSTRACT KEYWORDS
STEP 405
LOOP 2: HAVE ALL KEYWORDS IN MAIN KEYWORD OCCURRENCE RATE ASSOCIATION ARRAY BEEN PROCESSED ?
STEP 406
IS THERE A MAIN KEYWORD WITH AN OCCURRENCE RATE OF 80% OR HIGHER ?
NO
YES
APPEND THE MAIN KEYWORD TO THE CHARACTER STRING ARRAY FOR STORAGE OF ABSTRACT KEYWORDS, AND DELETE THE KEYWORD FROM THE CHARACTER STRING ARRAY FOR MAIN KEYWORD STORAGE OF STEP 405
STEP 407
LOOP 2
STEP 408
ARE THERE ELEMENTS IN THE CHARACTER STRING ARRAY IN WHICH THE MAIN KEYWORDS OF STEP 405 ARE STORED ?
NO
C
YES
DECLARE ASSOCIATION ARRAY FOR COMPUTATION OF ABSTRACT KEYWORD OCCURRENCE RATES
STEP 409
B

FIG.6

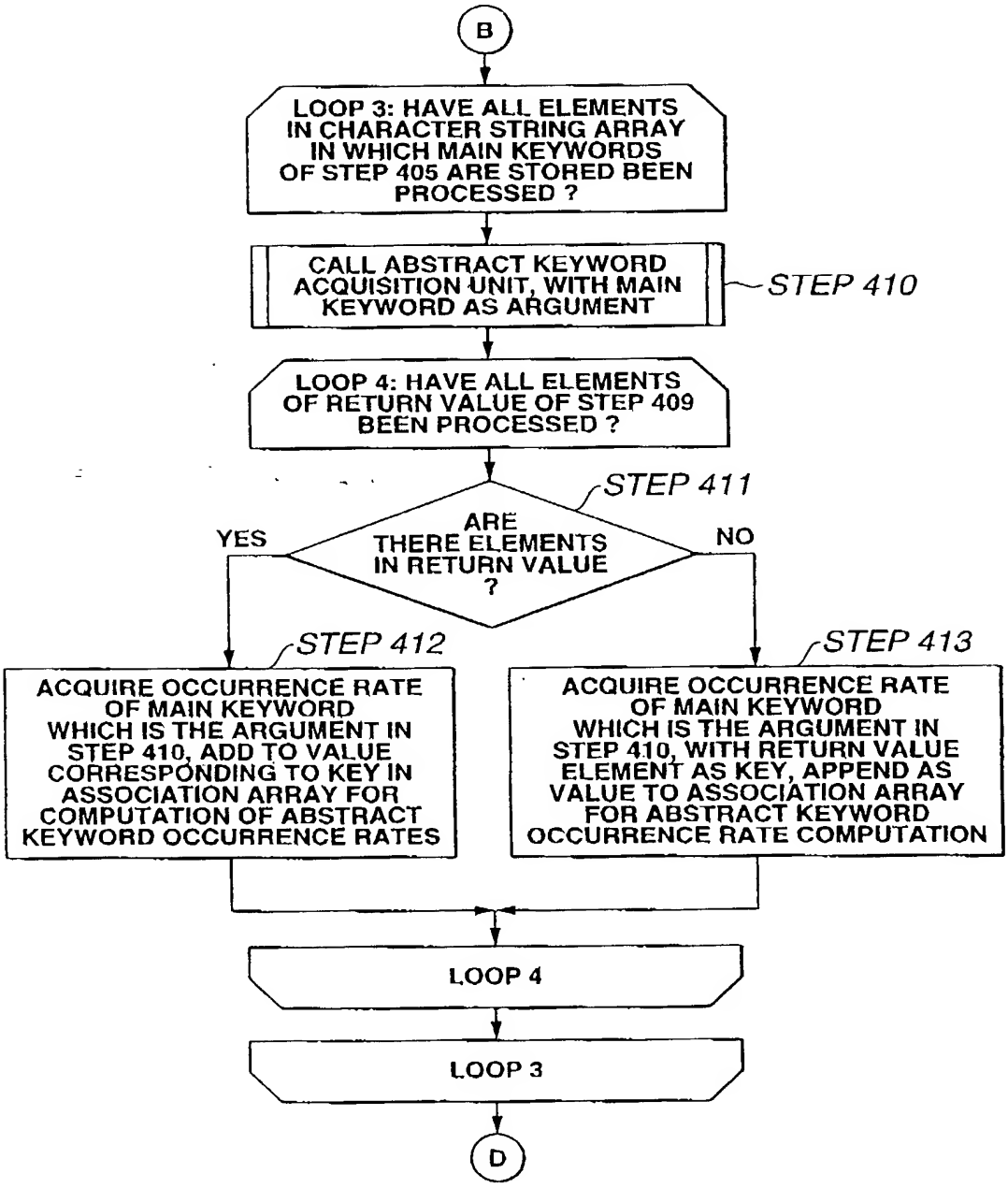

B
LOOP 3: HAVE ALL ELEMENTS IN CHARACTER STRING ARRAY IN WHICH MAIN KEYWORDS OF STEP 405 ARE STORED BEEN PROCESSED ?
CALL ABSTRACT KEYWORD ACQUISITION UNIT, WITH MAIN KEYWORD AS ARGUMENT
STEP 410
LOOP 4: HAVE ALL ELEMENTS OF RETURN VALUE OF STEP 409 BEEN PROCESSED ?
STEP 411
ARE THERE ELEMENTS IN RETURN VALUE ?
YES
NO
STEP 412
ACQUIRE OCCURRENCE RATE OF MAIN KEYWORD WHICH IS THE ARGUMENT IN STEP 410, ADD TO VALUE CORRESPONDING TO KEY IN ASSOCIATION ARRAY FOR COMPUTATION OF ABSTRACT KEYWORD OCCURRENCE RATES
STEP 413
ACQUIRE OCCURRENCE RATE OF MAIN KEYWORD WHICH IS THE ARGUMENT IN STEP 410, WITH RETURN VALUE ELEMENT AS KEY, APPEND AS VALUE TO ASSOCIATION ARRAY FOR ABSTRACT KEYWORD OCCURRENCE RATE COMPUTATION
LOOP 4
LOOP 3
D

FIG.7

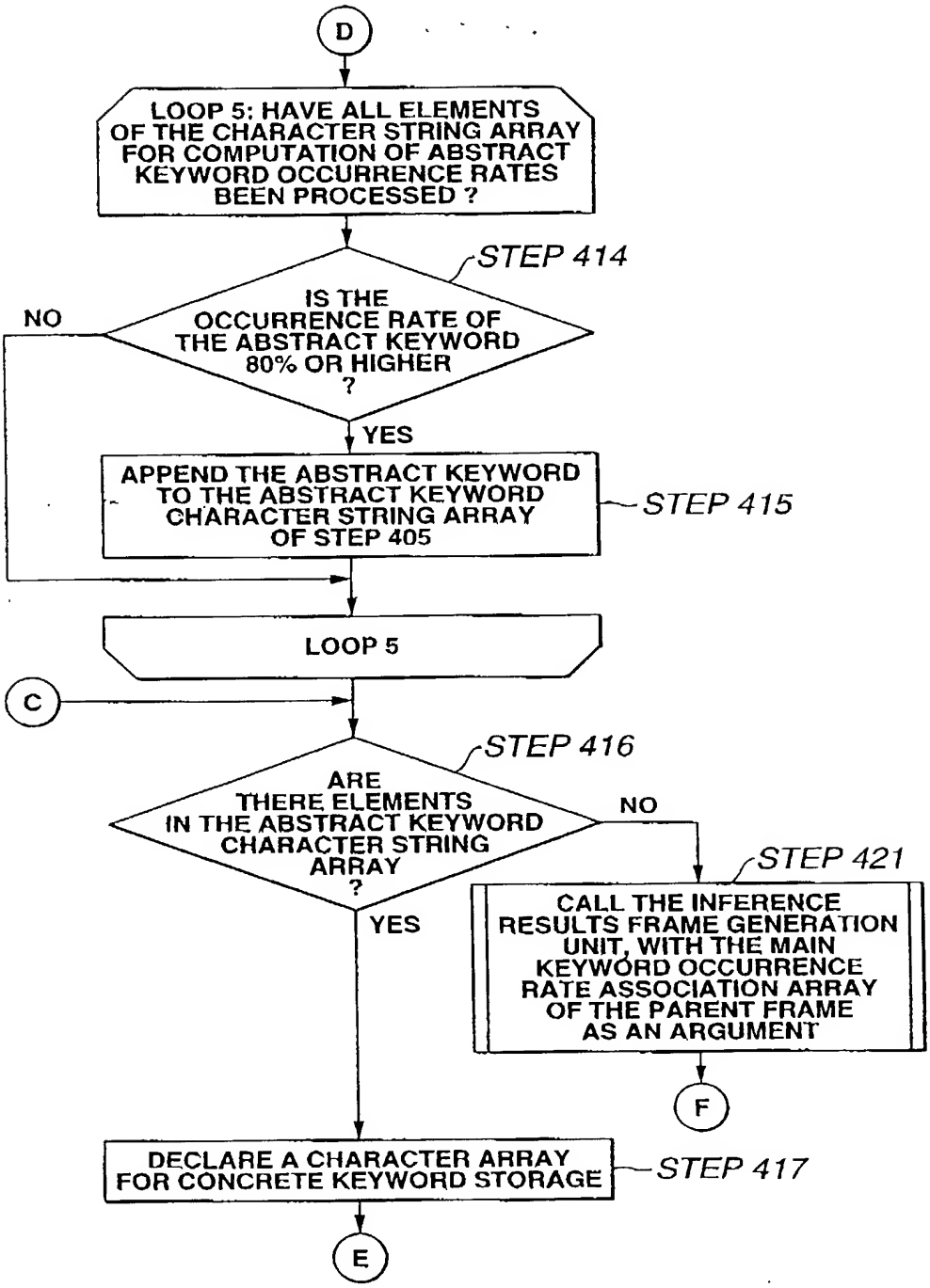

D
LOOP 5: HAVE ALL ELEMENTS OF THE CHARACTER STRING ARRAY FOR COMPUTATION OF ABSTRACT KEYWORD OCCURRENCE RATES BEEN PROCESSED ?
STEP 414
IS THE OCCURRENCE RATE OF THE ABSTRACT KEYWORD 80% OR HIGHER ?
NO
YES
APPEND THE ABSTRACT KEYWORD TO THE ABSTRACT KEYWORD CHARACTER STRING ARRAY OF STEP 405
STEP 415
LOOP 5
C
STEP 416
ARE THERE ELEMENTS IN THE ABSTRACT KEYWORD CHARACTER STRING ARRAY ?
NO
YES
STEP 421
CALL THE INFERENCE RESULTS FRAME GENERATION UNIT, WITH THE MAIN KEYWORD OCCURRENCE RATE ASSOCIATION ARRAY OF THE PARENT FRAME AS AN ARGUMENT
F
DECLARE A CHARACTER ARRAY FOR CONCRETE KEYWORD STORAGE
STEP 417
E

FIG.8

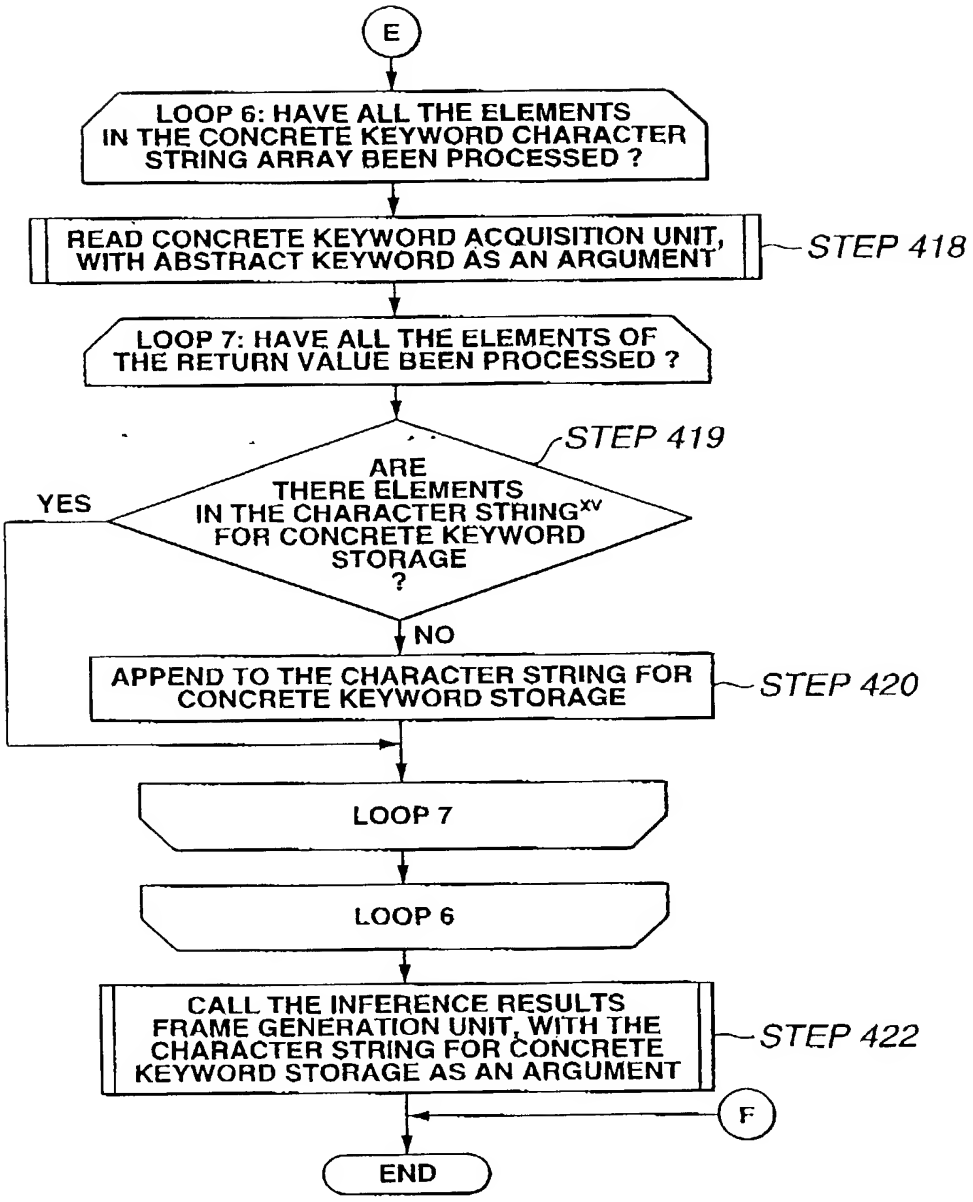

E
LOOP 6: HAVE ALL THE ELEMENTS IN THE CONCRETE KEYWORD CHARACTER STRING ARRAY BEEN PROCESSED ?
READ CONCRETE KEYWORD ACQUISITION UNIT, WITH ABSTRACT KEYWORD AS AN ARGUMENT
STEP 418
LOOP 7: HAVE ALL THE ELEMENTS OF THE RETURN VALUE BEEN PROCESSED ?
STEP 419
ARE THERE ELEMENTS IN THE CHARACTER STRING[xv] FOR CONCRETE KEYWORD STORAGE ?
YES
NO
APPEND TO THE CHARACTER STRING FOR CONCRETE KEYWORD STORAGE
STEP 420
LOOP 7
LOOP 6
CALL THE INFERENCE RESULTS FRAME GENERATION UNIT, WITH THE CHARACTER STRING FOR CONCRETE KEYWORD STORAGE AS AN ARGUMENT
STEP 422
F
END

FIG.9

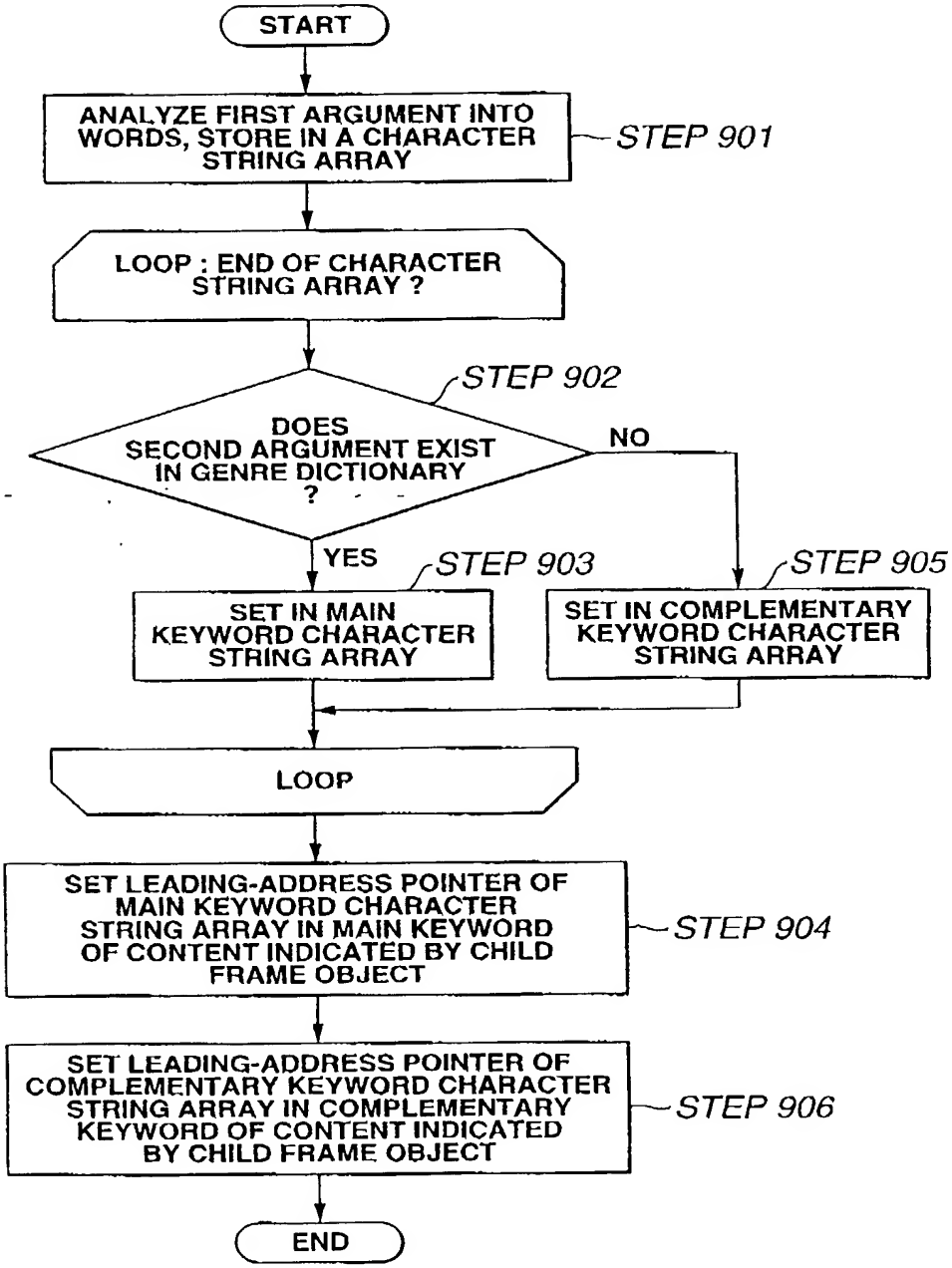

START
ANALYZE FIRST ARGUMENT INTO WORDS, STORE IN A CHARACTER STRING ARRAY
STEP 901
LOOP : END OF CHARACTER STRING ARRAY ?
STEP 902
DOES SECOND ARGUMENT EXIST IN GENRE DICTIONARY ?
NO
YES
STEP 903
SET IN MAIN KEYWORD CHARACTER STRING ARRAY
STEP 905
SET IN COMPLEMENTARY KEYWORD CHARACTER STRING ARRAY
LOOP
SET LEADING-ADDRESS POINTER OF MAIN KEYWORD CHARACTER STRING ARRAY IN MAIN KEYWORD OF CONTENT INDICATED BY CHILD FRAME OBJECT
STEP 904
SET LEADING-ADDRESS POINTER OF COMPLEMENTARY KEYWORD CHARACTER STRING ARRAY IN COMPLEMENTARY KEYWORD OF CONTENT INDICATED BY CHILD FRAME OBJECT
STEP 906
END

FIG.10

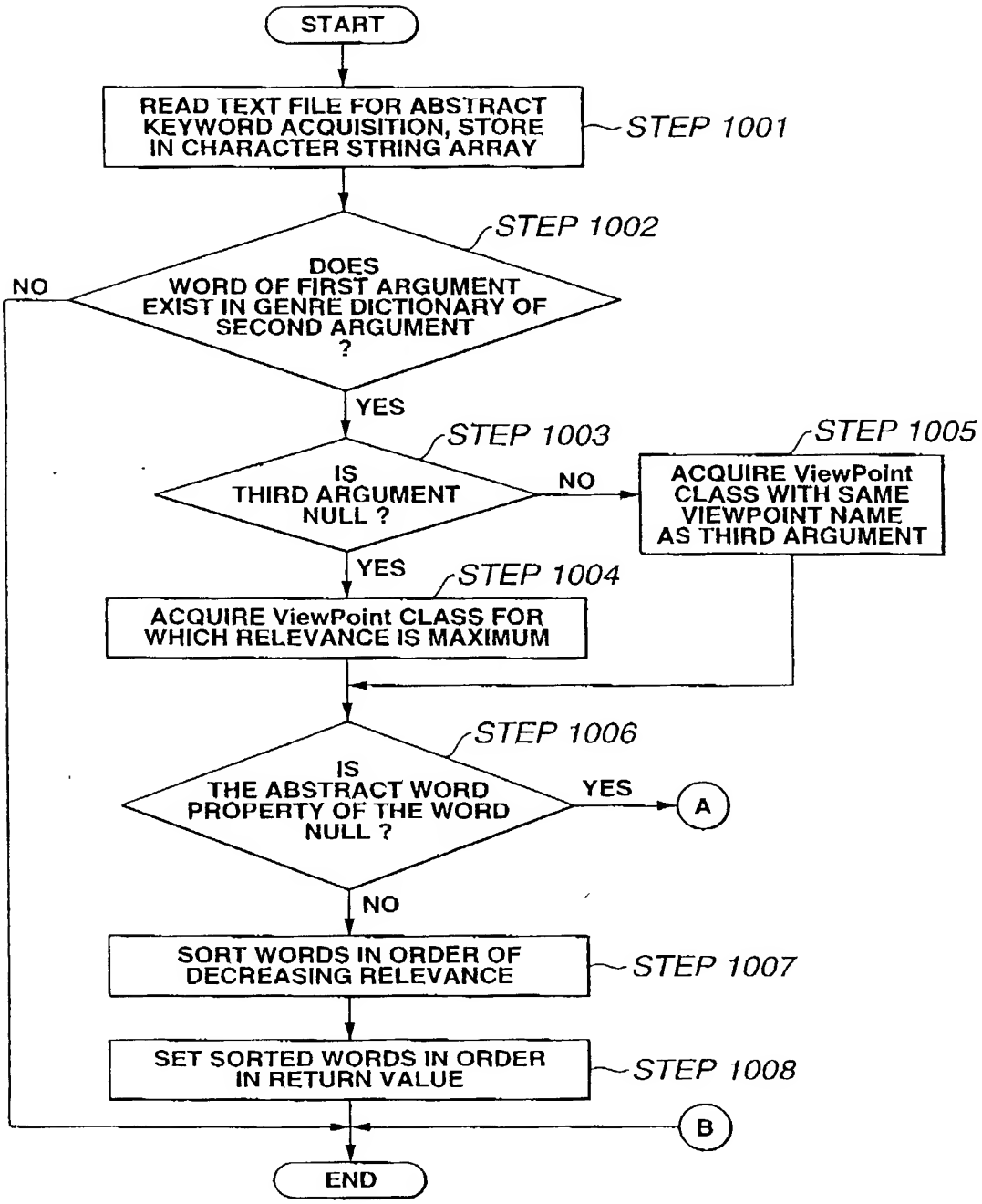

START
READ TEXT FILE FOR ABSTRACT KEYWORD ACQUISITION, STORE IN CHARACTER STRING ARRAY
STEP 1001
STEP 1002
DOES WORD OF FIRST ARGUMENT EXIST IN GENRE DICTIONARY OF SECOND ARGUMENT ?
NO
YES
STEP 1003
IS THIRD ARGUMENT NULL ?
NO
STEP 1005
ACQUIRE ViewPoint CLASS WITH SAME VIEWPOINT NAME AS THIRD ARGUMENT
YES
STEP 1004
ACQUIRE ViewPoint CLASS FOR WHICH RELEVANCE IS MAXIMUM
STEP 1006
IS THE ABSTRACT WORD PROPERTY OF THE WORD NULL ?
YES
A
NO
SORT WORDS IN ORDER OF DECREASING RELEVANCE
STEP 1007
SET SORTED WORDS IN ORDER IN RETURN VALUE
STEP 1008
B
END

FIG.11

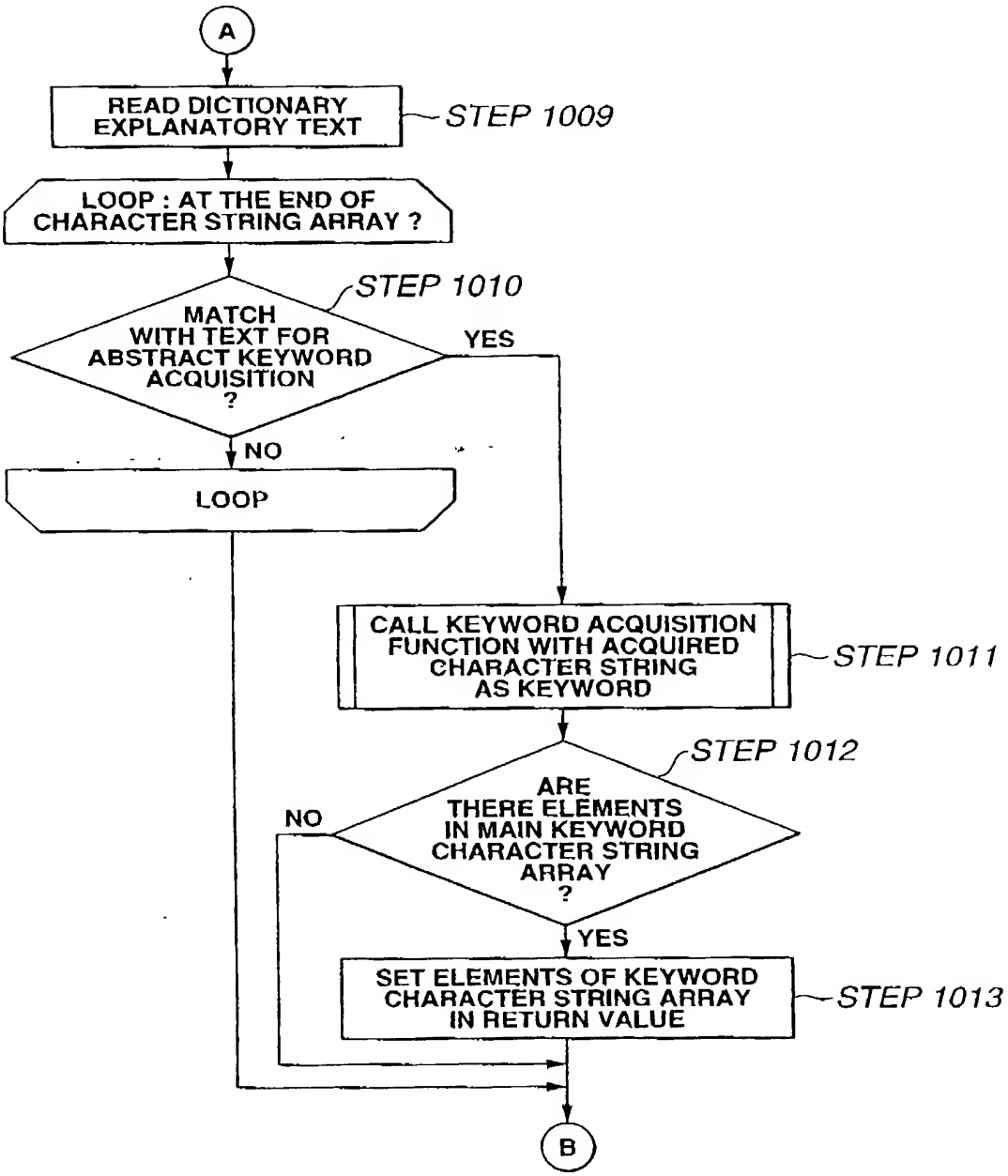

A
READ DICTIONARY EXPLANATORY TEXT
STEP 1009
LOOP : AT THE END OF CHARACTER STRING ARRAY ?
STEP 1010
MATCH WITH TEXT FOR ABSTRACT KEYWORD ACQUISITION ?
YES
NO
LOOP
CALL KEYWORD ACQUISITION FUNCTION WITH ACQUIRED CHARACTER STRING AS KEYWORD
STEP 1011
STEP 1012
ARE THERE ELEMENTS IN MAIN KEYWORD CHARACTER STRING ARRAY ?
NO
YES
SET ELEMENTS OF KEYWORD CHARACTER STRING ARRAY IN RETURN VALUE
STEP 1013
B

FIG.12

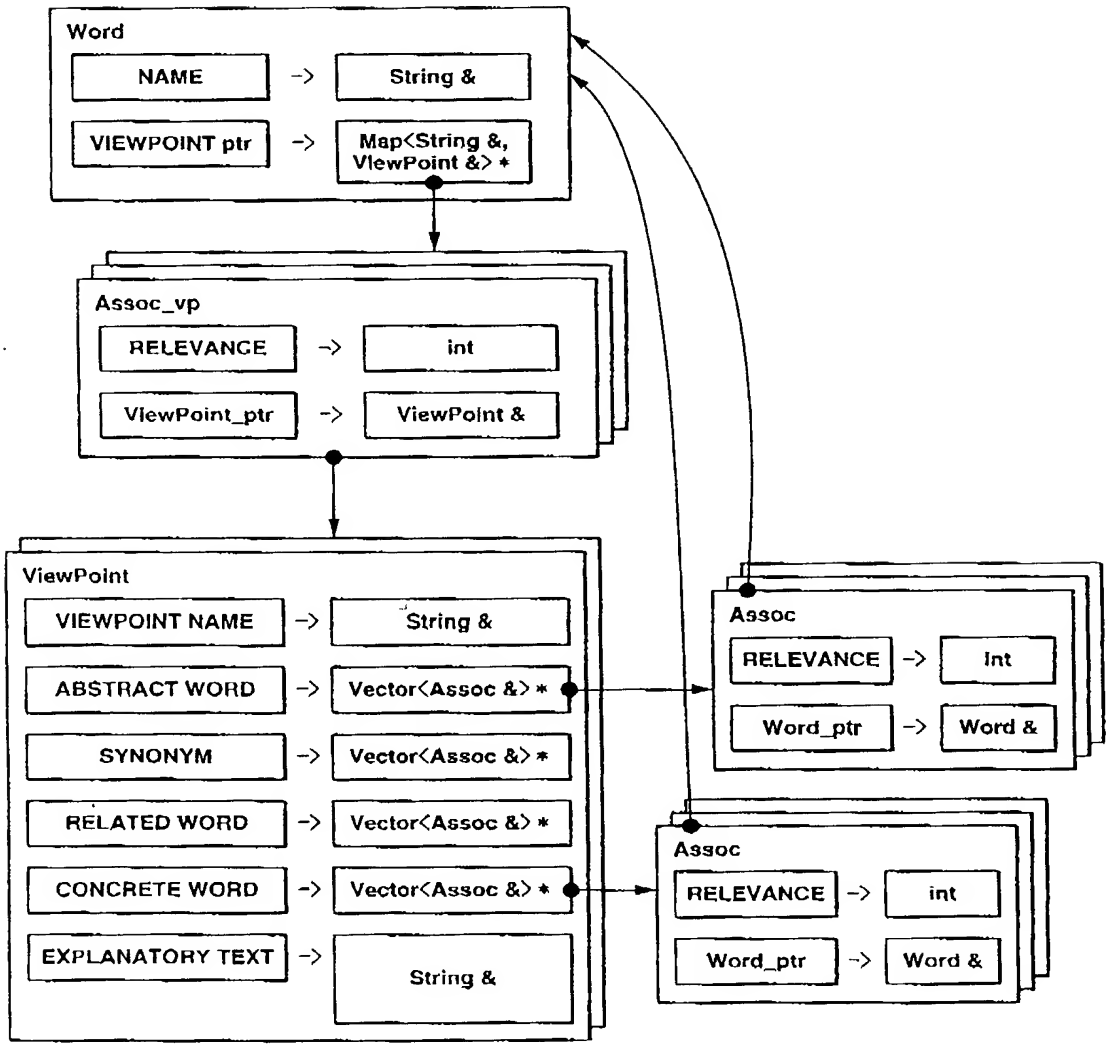

Word
NAME
->
String &
VIEWPOINT ptr
->
Map<String &, ViewPoint &> *
Assoc_vp
RELEVANCE
->
int
ViewPoint_ptr
->
ViewPoint &
ViewPoint
VIEWPOINT NAME
->
String &
ABSTRACT WORD
->
Vector<Assoc &> *
SYNONYM
->
Vector<Assoc &> *
RELATED WORD
->
Vector<Assoc &> *
CONCRETE WORD
->
Vector<Assoc &> *
EXPLANATORY TEXT
->
String &
Assoc
RELEVANCE
->
Int
Word_ptr
->
Word &
Assoc
RELEVANCE
->
int
Word_ptr
->
Word &

FIG.13

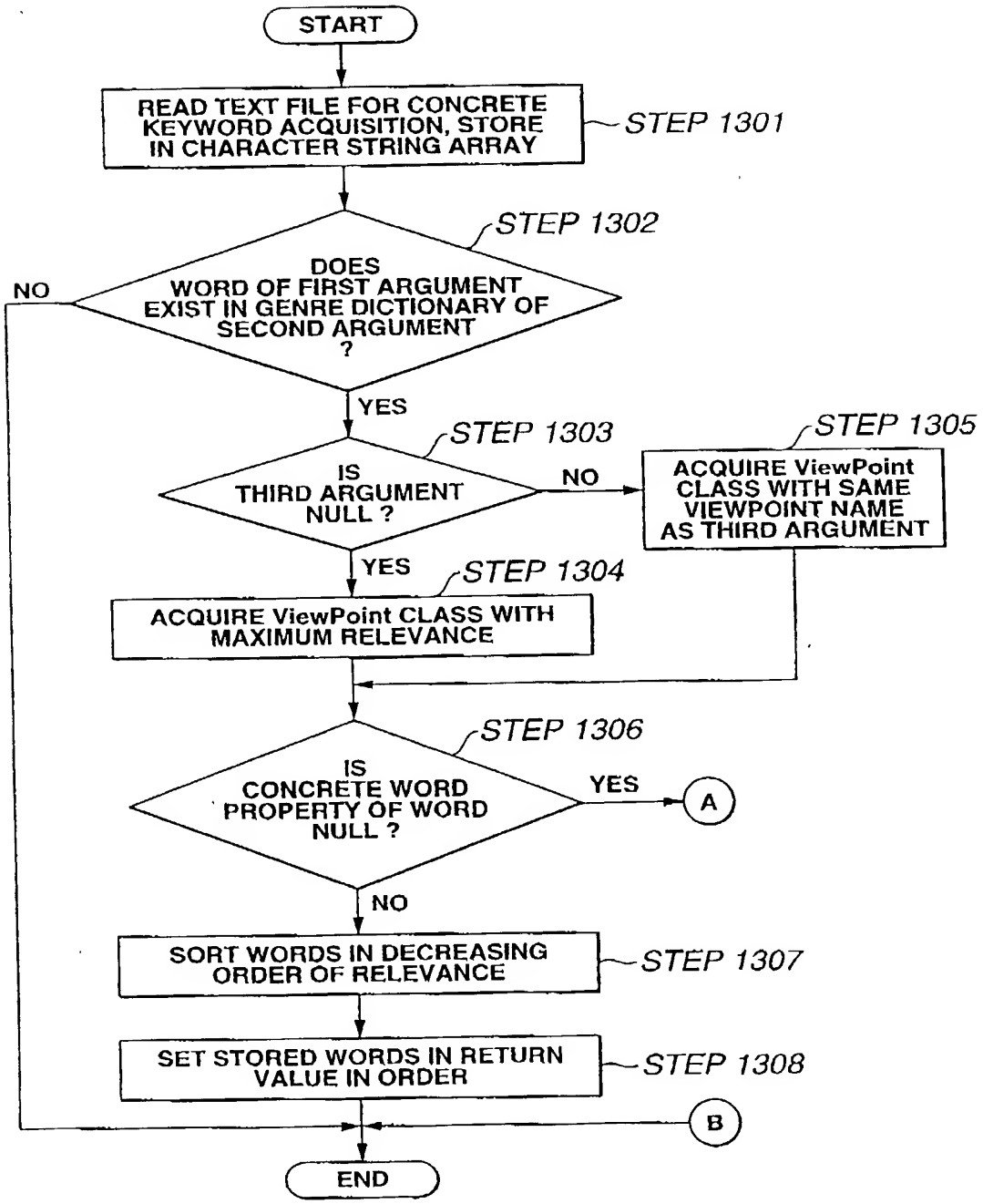

START
READ TEXT FILE FOR CONCRETE KEYWORD ACQUISITION, STORE IN CHARACTER STRING ARRAY
STEP 1301
STEP 1302
DOES WORD OF FIRST ARGUMENT EXIST IN GENRE DICTIONARY OF SECOND ARGUMENT ?
NO
YES
STEP 1303
IS THIRD ARGUMENT NULL ?
NO
STEP 1305
ACQUIRE ViewPoint CLASS WITH SAME VIEWPOINT NAME AS THIRD ARGUMENT
YES
STEP 1304
ACQUIRE ViewPoint CLASS WITH MAXIMUM RELEVANCE
STEP 1306
IS CONCRETE WORD PROPERTY OF WORD NULL ?
YES
A
NO
SORT WORDS IN DECREASING ORDER OF RELEVANCE
STEP 1307
SET STORED WORDS IN RETURN VALUE IN ORDER
STEP 1308
B
END

FIG.14

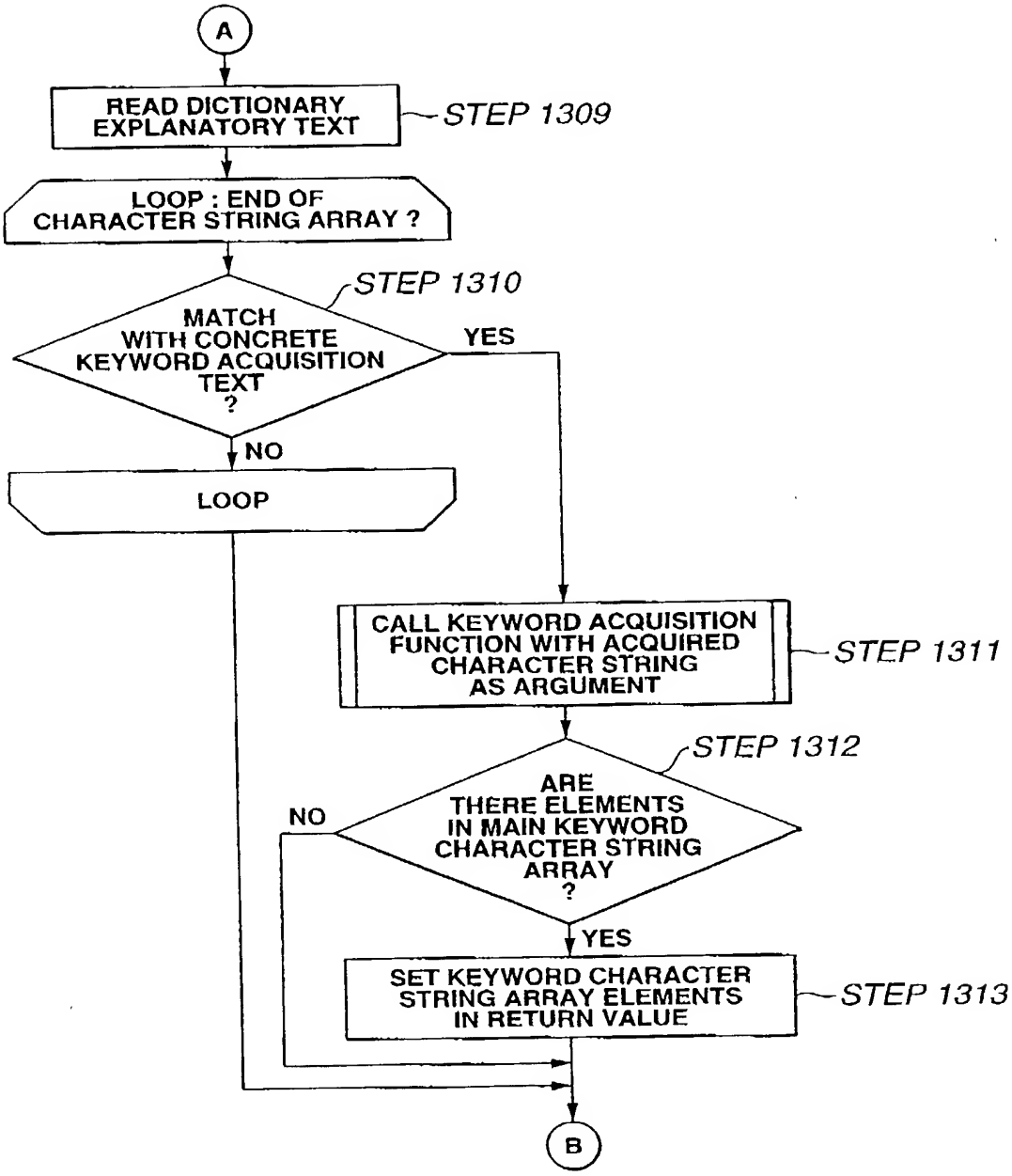

A
READ DICTIONARY EXPLANATORY TEXT
STEP 1309
LOOP : END OF CHARACTER STRING ARRAY ?
STEP 1310
MATCH WITH CONCRETE KEYWORD ACQUISITION TEXT ?
YES
NO
LOOP
CALL KEYWORD ACQUISITION FUNCTION WITH ACQUIRED CHARACTER STRING AS ARGUMENT
STEP 1311
STEP 1312
ARE THERE ELEMENTS IN MAIN KEYWORD CHARACTER STRING ARRAY ?
NO
YES
SET KEYWORD CHARACTER STRING ARRAY ELEMENTS IN RETURN VALUE
STEP 1313
B

FIG.15

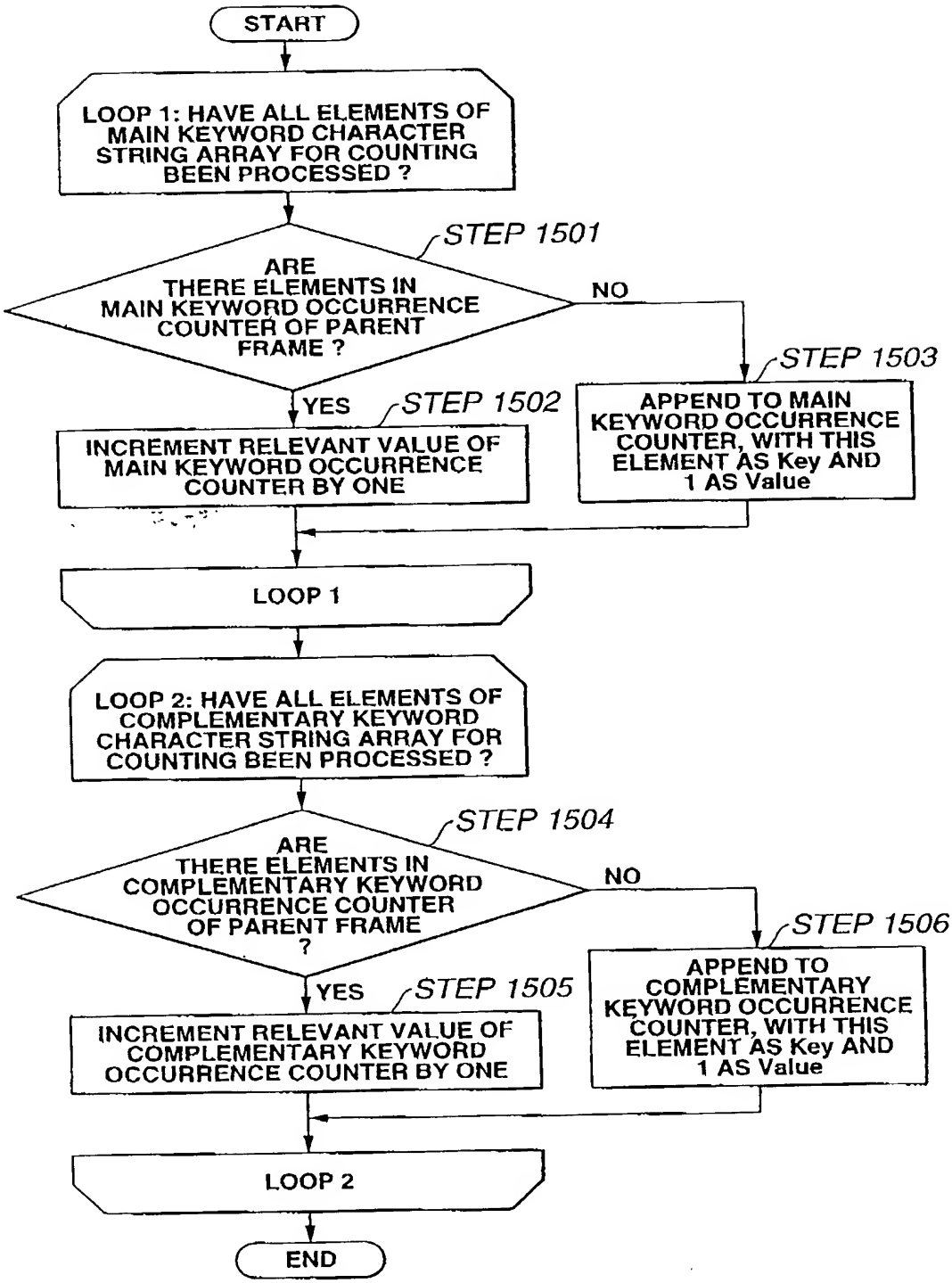

START
LOOP 1: HAVE ALL ELEMENTS OF MAIN KEYWORD CHARACTER STRING ARRAY FOR COUNTING BEEN PROCESSED ?
STEP 1501
ARE THERE ELEMENTS IN MAIN KEYWORD OCCURRENCE COUNTER OF PARENT FRAME ?
NO
YES
STEP 1502
INCREMENT RELEVANT VALUE OF MAIN KEYWORD OCCURRENCE COUNTER BY ONE
STEP 1503
APPEND TO MAIN KEYWORD OCCURRENCE COUNTER, WITH THIS ELEMENT AS Key AND 1 AS Value
LOOP 1
LOOP 2: HAVE ALL ELEMENTS OF COMPLEMENTARY KEYWORD CHARACTER STRING ARRAY FOR COUNTING BEEN PROCESSED ?
STEP 1504
ARE THERE ELEMENTS IN COMPLEMENTARY KEYWORD OCCURRENCE COUNTER OF PARENT FRAME ?
NO
YES
STEP 1505
INCREMENT RELEVANT VALUE OF COMPLEMENTARY KEYWORD OCCURRENCE COUNTER BY ONE
STEP 1506
APPEND TO COMPLEMENTARY KEYWORD OCCURRENCE COUNTER, WITH THIS ELEMENT AS Key AND 1 AS Value
LOOP 2
END

FIG.16

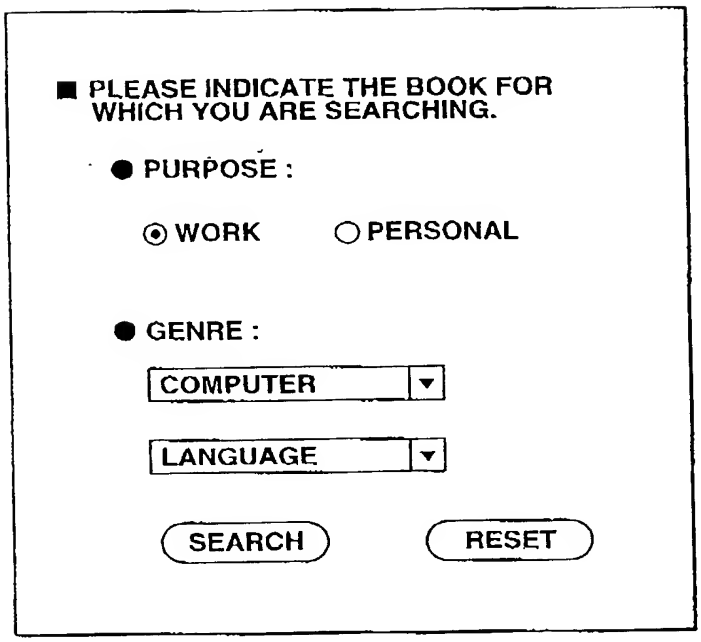

■ PLEASE INDICATE THE BOOK FOR WHICH YOU ARE SEARCHING.
● PURPOSE :
◉ WORK
○ PERSONAL
● GENRE :
COMPUTER
LANGUAGE
SEARCH
RESET

FIG.17

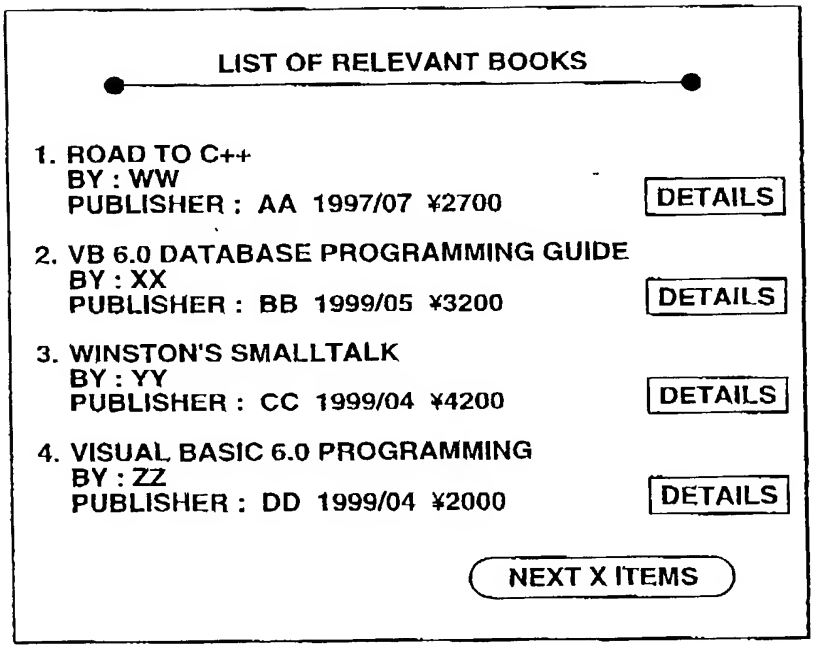
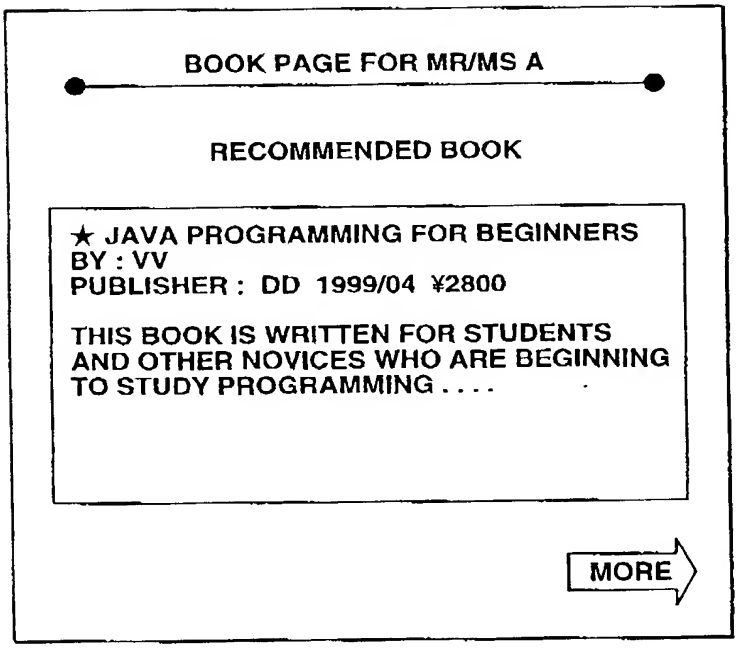

LIST OF RELEVANT BOOKS
1. ROAD TO C++
BY : WW
PUBLISHER : AA 1997/07 ¥2700
DETAILS
2. VB 6.0 DATABASE PROGRAMMING GUIDE
BY : XX
PUBLISHER : BB 1999/05 ¥3200
DETAILS
3. WINSTON'S SMALLTALK
BY : YY
PUBLISHER : CC 1999/04 ¥4200
DETAILS
4. VISUAL BASIC 6.0 PROGRAMMING
BY : ZZ
PUBLISHER : DD 1999/04 ¥2000
DETAILS
NEXT X ITEMS

FIG.18


BOOK PAGE FOR MR/MS A
RECOMMENDED BOOK
★ JAVA PROGRAMMING FOR BEGINNERS
BY : VV
PUBLISHER : DD 1999/04 ¥2800
THIS BOOK IS WRITTEN FOR STUDENTS AND OTHER NOVICES WHO ARE BEGINNING TO STUDY PROGRAMMING . . . .
MORE

Declaration and Power of Attorney For Patent Application
特許出願宣言書及び委任状

Japanese Language Declaration
日本語宣言書

下記の氏名の発明者として、私は以下の通り宣言します。
私の住所、私書箱、国籍は下記の私の氏名の後に記載された通りです。

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name,

下記の名称の発明に関して請求範囲に記載され、特許出願している発明内容について、私が最初かつ唯一の発明者（下記の氏名が一つの場合）もしくは最初かつ共同発明者であると（下記の名称が複数の場合）信じています。

I believe I am the original, first and sole inventor(if only one name is listed below) or an original, first and joint inventor(if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled

キーワード推論装置及びキーワード推論方法

KEYWORD INFERRING DEVICE AND KEYWORD INFERRING METHOD

上記発明の明細書（下記の欄で×印が付いていない場合は、本書に添付）は、

the specification of which is attached hereto unless the following box is checked:

☒ 2002年2月11日に提出され、米国出願番号または特許協定条約国際出願番号を 10/049,384、
（該当する場合）2000年11月16日、2001年4月6日に訂正されました。

☒ was filed on February 11, 2002 as United States Application Number or PCT International Application Number 10/049,384 and was amended on November 16, 2000 and April 6, 2001 (if applicable).

私は、特許請求範囲を含む上記訂正後の明細書を検討し、同内容を理解していることをここに表明します。

I hereby state I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

私は、第37編連邦規則法典第1章56条に定義されるとおり、特許資格の有無について重大な意味を持つ情報を開示する義務があることを認めます。

I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, §1.56

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私は、第３５編米国法典１１９章にもとづき下記の外国でなされた特許もしくは発明者証の出願についての外国優先権をここに主張するとともに、優先権を主張した出願の前に提出された特許または発明者証の外国出願を以下に示しています。

I hereby claim foreign priority under Title 35, United States Code, § 119 of any foreign application(s) for patent or inventor's certificate listed below and have also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed.

過去の外国における出願

(Number) (番号)	(Country) (国名)	(Day/Month/Year Filed) (出願年月日)	優先権の主張 Yes はい	No いいえ
11-228050	Japan	11th/August/1999	☒	☐
			☐	☐
			☐	☐

私は、第３５編米国法典１２０章にもとづいて下記の米国特許出願に授与された利益をここに主張致します。また、本出願の各請求範囲の内容が過去に第３５編米国法典１１２章第１条で規定された方法で米国特許出願により開示されていない限り、過去の米国出願書提出日以降、本出願書の日本国内または特許協力条約国際提出日までの期間中に入手され、しかも第３７編連邦規則法典１章５６条で定義された特許資格の有無に重大な意味のある情報については、開示義務があることを私は認めます。

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, § 112, I acknowledge the duty to disclose information which is material to patentability as defined in Title 37, Code of Federal Regulations, § 1.56 which became available between the filing date of the prior application and the national or PCT international filing date of this application.

(Application Serial No) (出願番号)	(Filing Date) (出願日)	(現況) (特許許可済み、係属中、放棄済み)	(Status) (Patented, Pending, Abandoned)
PCT/JP00/05414	August 11, 2000	係属中	Pending

私は本書中の私自身の知識にもとづく表明が真実であり、かつ他から聞いた情報及び私が信じるところを基とする表明が全て真実であると信じていること、さらに故意になされた虚偽の表明及びその他は第１８編米国法典第１００１章に基づき罰金、または拘禁、もしくはその両方により罰されること、またそのような故意の虚偽による表明があると出願または許可された特許の有効性が損なわれることを承知の上で上記表明をなしていることをここに宣言致します。

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

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委任状：下記の発明者として、私は本出願の手続きを遂行し、同出願に関連する特許商標庁との一切の取引を取り扱うため、以下の弁護士及び（または）代理人をここに指名致します。（弁護士、代理人の氏名及び登録番号を明記のこと）
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Adenike Adewuya, Reg. No. P42,254

(4)

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith (*list name and registration number*)
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第二共同発明者(該当する場合)	Full name of second joint inventor, if any
第二発明者	Second inventor's signature　date
住所	Residence
国籍	Citizenship
郵便の宛先	Post Office Address

第三以降の共同発明者についても同様の情報及び署名を記載(Supply similar information and signature for third and subsequent joint inventors)のこと)